Oregon Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final Environmental Impact Statement

Volume III

US Department of the Interior
Bureau of Land Management

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BLM

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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APPENDICES

Appendices Introduction

APPENDICES INTRODUCTION

Changes between the DEIS and FEIS include the following:

- Appendix A:
  - Data used to create the maps was updated or refined;
  - Sagebrush Focal Areas were incorporated; and
  - Figures for the Proposed Plan were added.
- Appendix B: There were minimal changes to this appendix.
- Appendix C:
  - DEIS Appendices B and C were combined into this single appendix.
  - RDFs and BMPs were revised.
- Appendix D: This FEIS appendix was not in the DEIS.
- Appendix E: This appendix was completely revised.
- Appendix F:
  - Stipulations and stipulation descriptions were updated for Alternatives A through F.
  - Stipulations and stipulation descriptions were added for the Proposed Plan.
- Appendix G: This appendix was completely revised.
- Appendix H: This appendix was completely revised.
- Appendix I: DEIS Appendix I information was moved to Chapter 3, Special Designations. This FEIS appendix was not in the DEIS.
- Appendix J: There were minimal changes to this appendix.

- Appendix K: There were minor changes to this appendix.
- Appendix L: There were minor changes to this appendix.
- Appendix M: There were minimal changes to this appendix.
- Appendix N: Livestock grazing information was updated.
- Appendix O: There were minimal changes to this appendix.
- Appendix P: There were minimal changes to this appendix.
- Appendix Q: There were minimal changes to this appendix.
- Appendix R: Livestock grazing and renewable energy information was updated or added.
- Appendix S: This FEIS appendix was not in the DEIS.
- Appendix T: This FEIS appendix was not in the DEIS.
- Appendix U: Information from DEIS Section 3.3 Vegetation was placed in this appendix.
- Appendix V: This FEIS appendix was not in the DEIS.
- Appendix W: This FEIS appendix was not in the DEIS.

Appendix A

Chapter 2 Alternatives Figures

APPENDIX A
CHAPTER 2 ALTERNATIVES FIGURES

The figures listed in Table A-1 are for Chapter 2 Tables 2-10 and 2-11. The figures listed in Table A-1 are provided after the table and depict the differences between the alternatives.

The figures in Table A-1 are provided after the table and depict the differences between the alternatives on GRSG habitat (PHMA/GHMA) only. Tables 2-10 and 2-11 include nonhabitat acreages. In order to simplify the maps, display of nonhabitat areas was removed from the maps.

Table A-1
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2-5	Greater Sage-Grouse Habitat in the Planning Area
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Chapter 2 Alternatives Figures

Figure Number	Figure Title
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2-49	Salable Minerals in the Planning Area Proposed Plan
2-50	Non-Energy Leasable Minerals in the Planning Area Proposed Plan

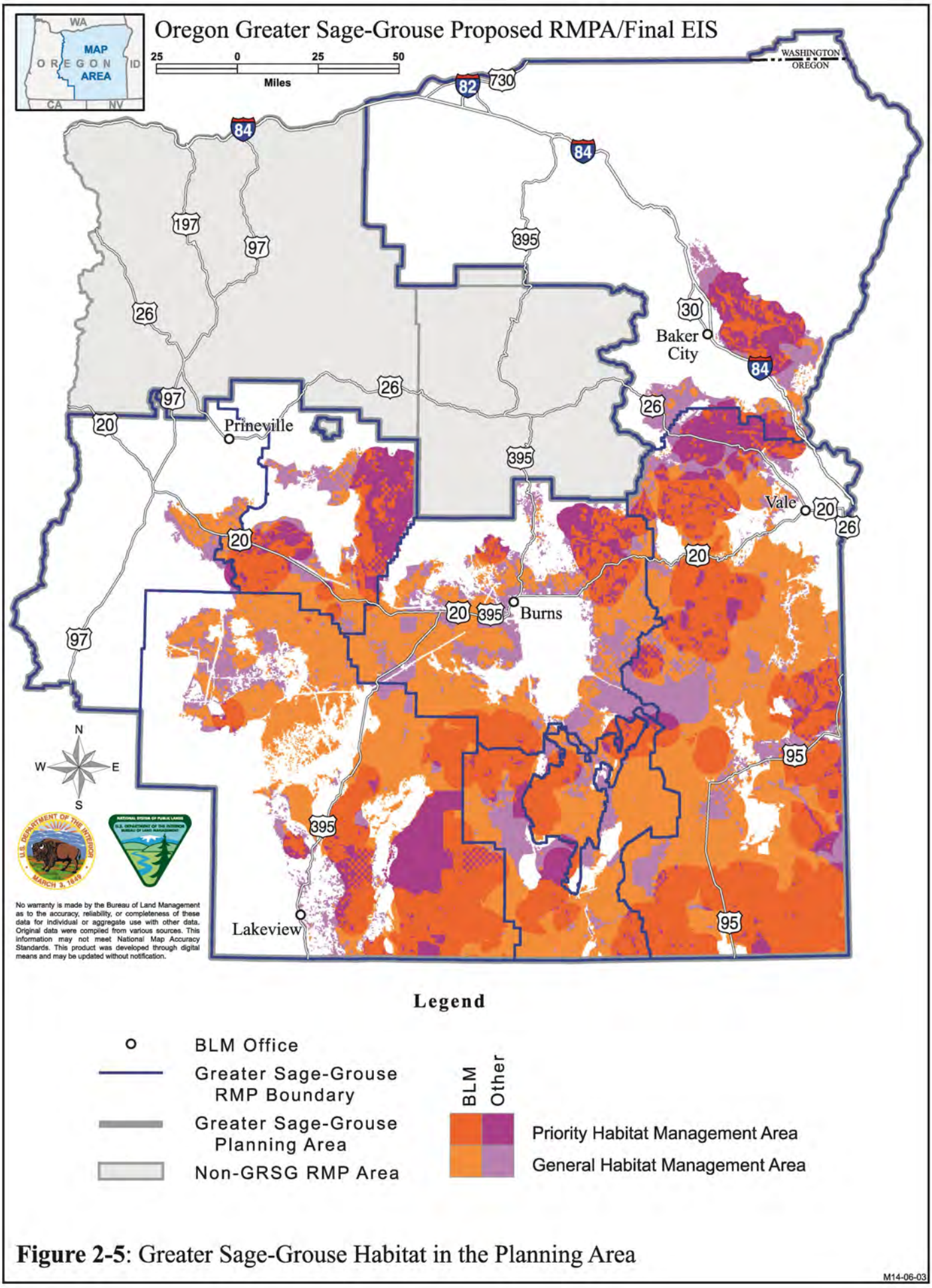

Figure 2-5: Greater Sage-Grouse Habitat in the Planning Area

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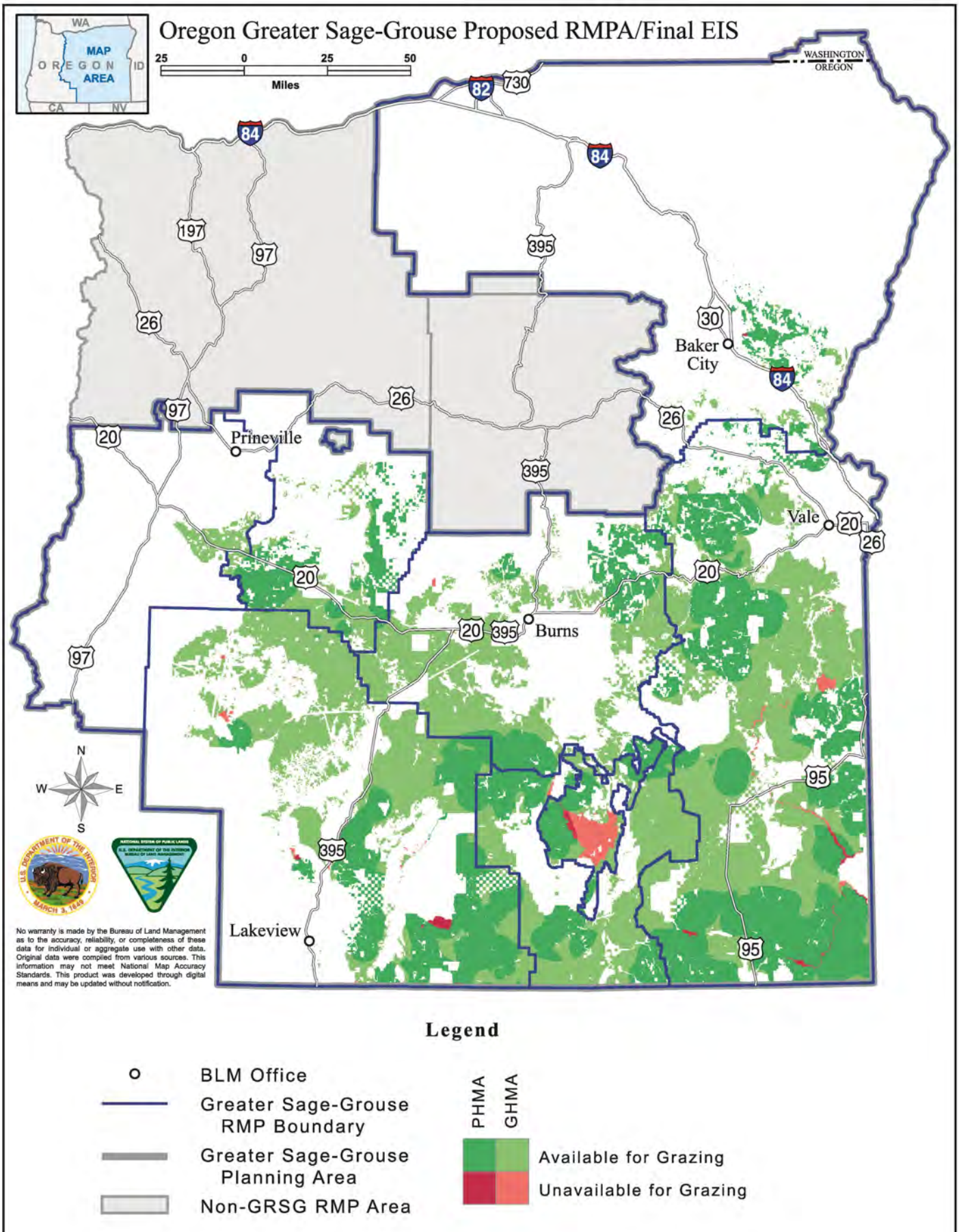

Figure 2-6: Livestock Grazing in the Planning Area Alternatives A (No Action), B, and E

M14-06-03

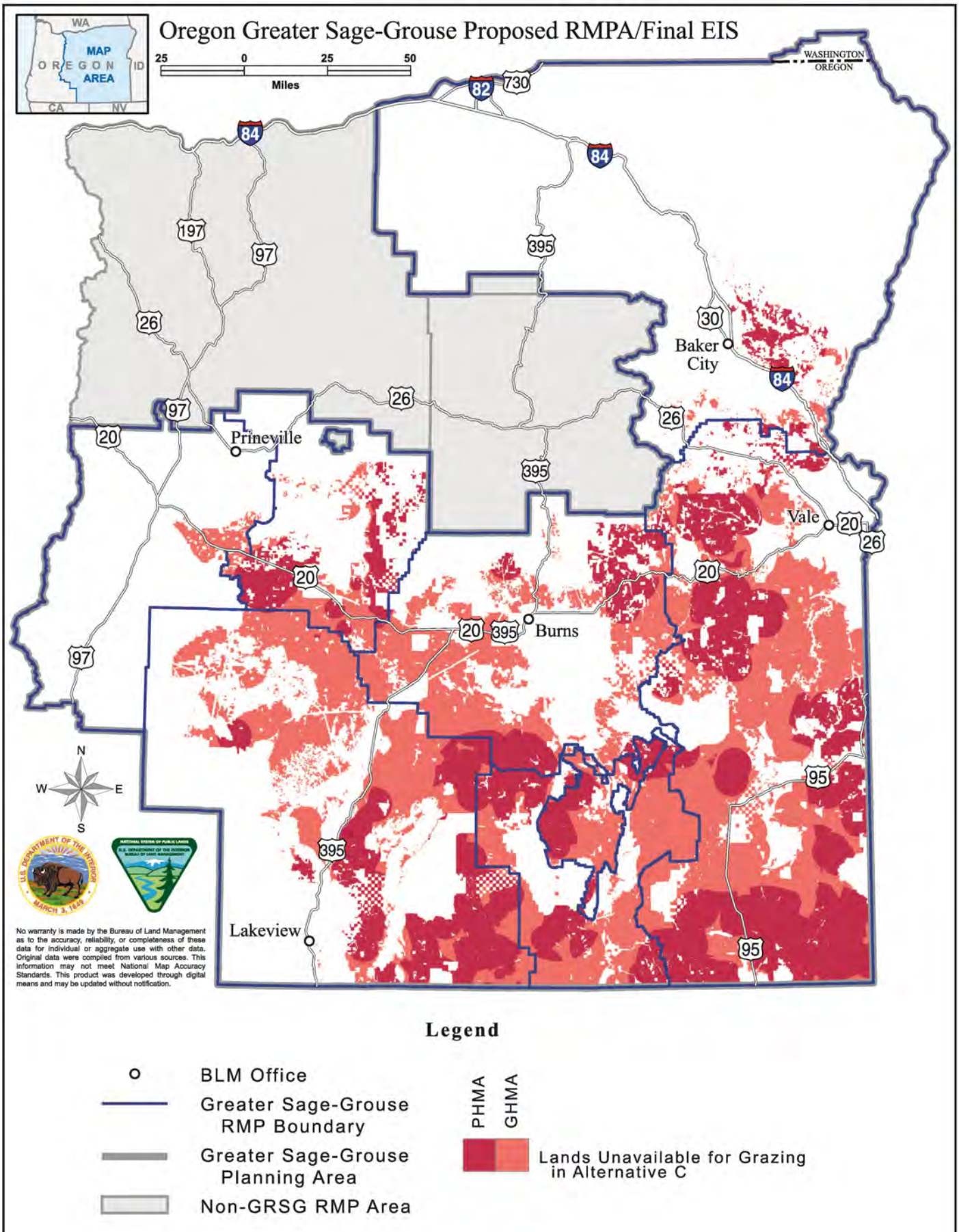

Figure 2-7: Livestock Grazing in the Planning Area Alternative C

M14-06-03

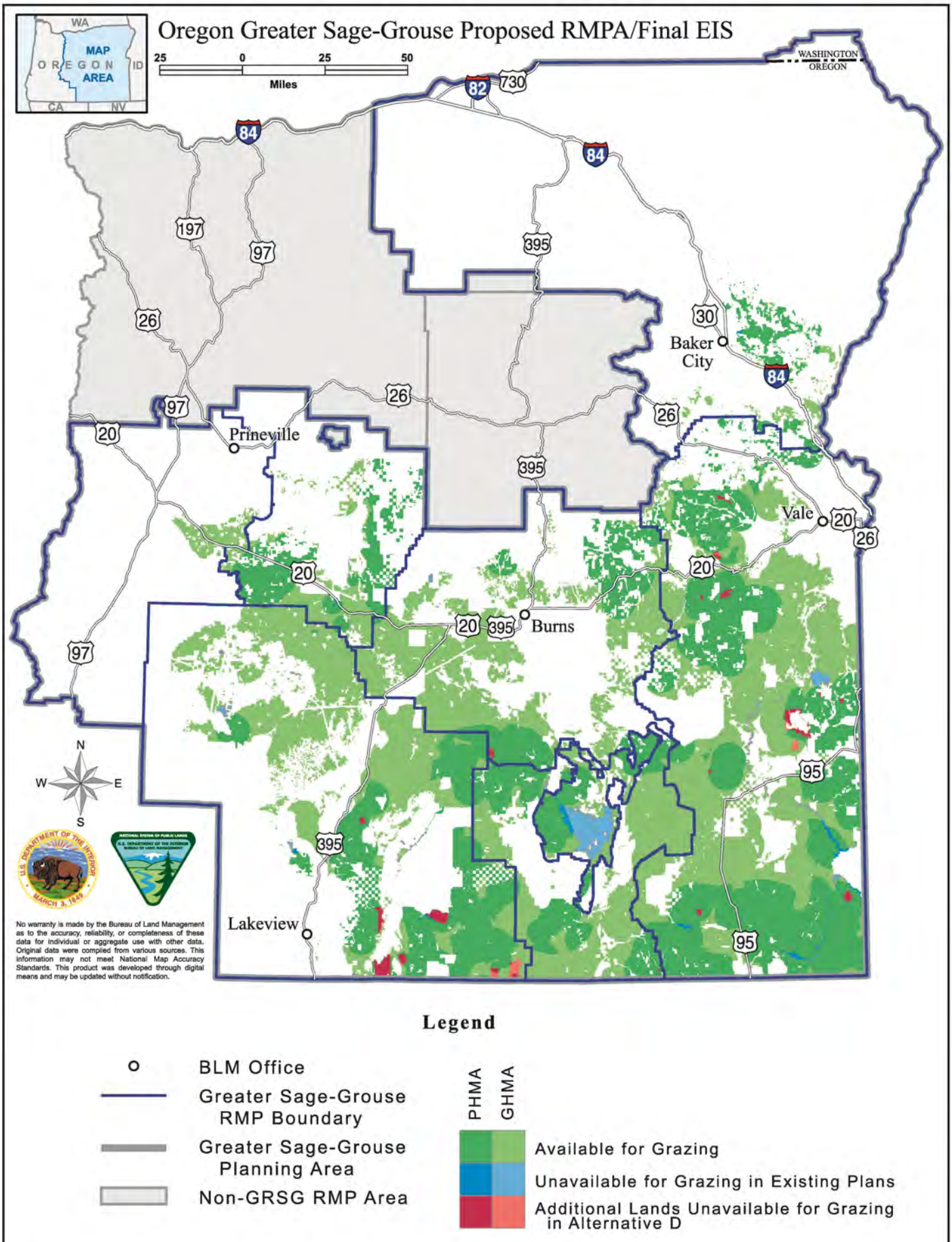

Figure 2-8: Livestock Grazing in the Planning Area Alternative D

M14-06-03

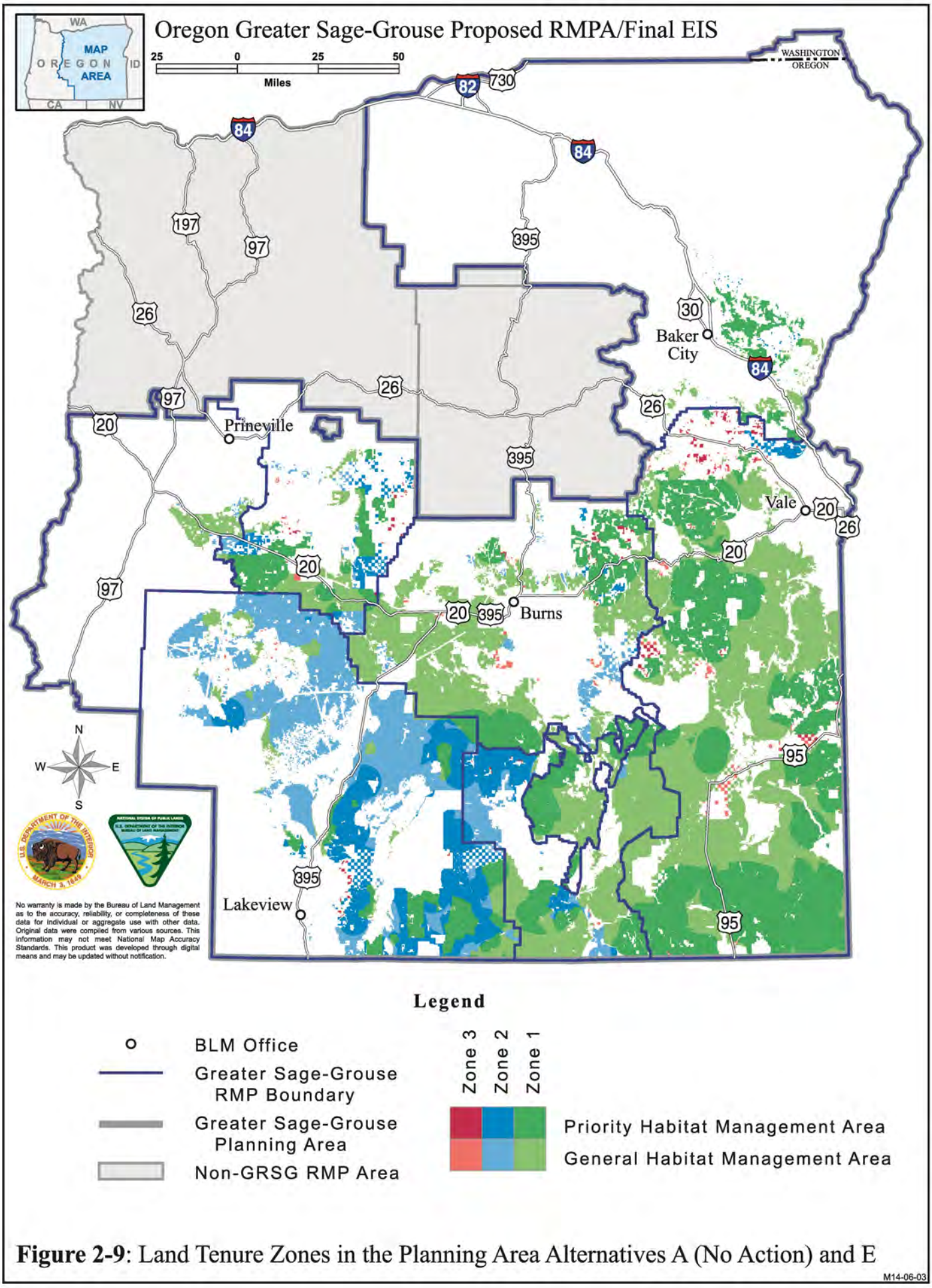

Figure 2-9: Land Tenure Zones in the Planning Area Alternatives A (No Action) and E

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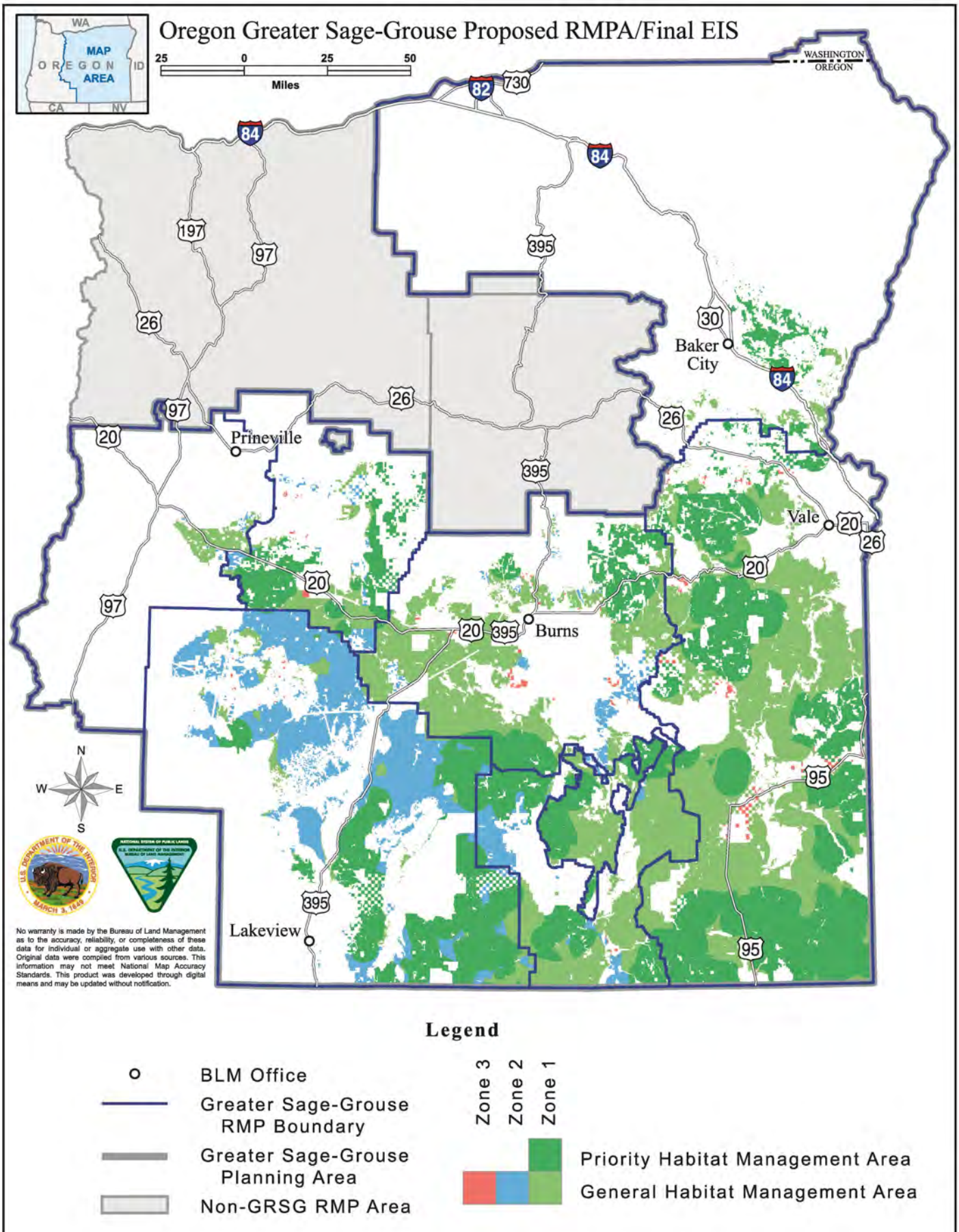

Figure 2-10: Land Tenure Zones in the Planning Area Alternatives B, D, and F

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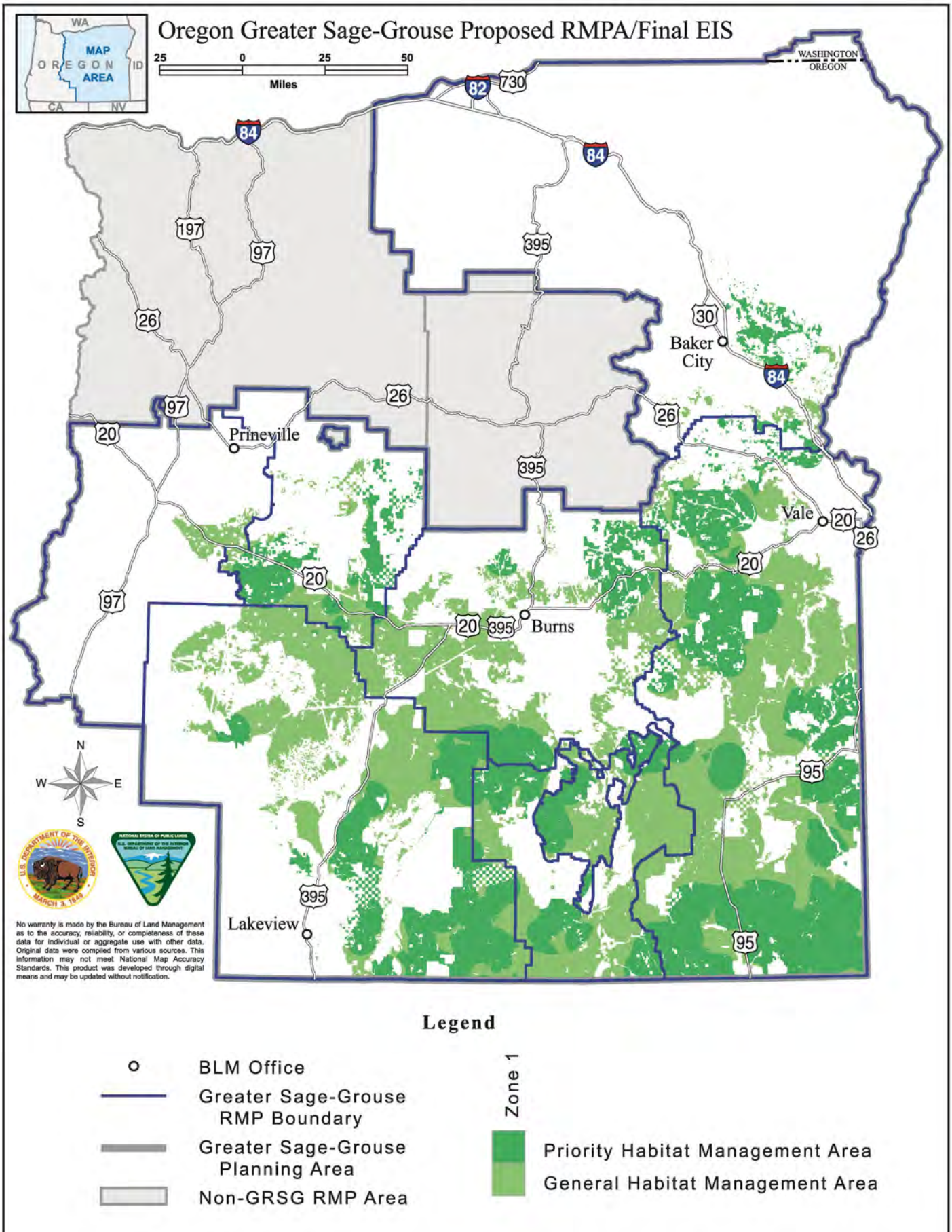

Figure 2-11: Land Tenure Zones in the Planning Area Alternative C

M14-06-03

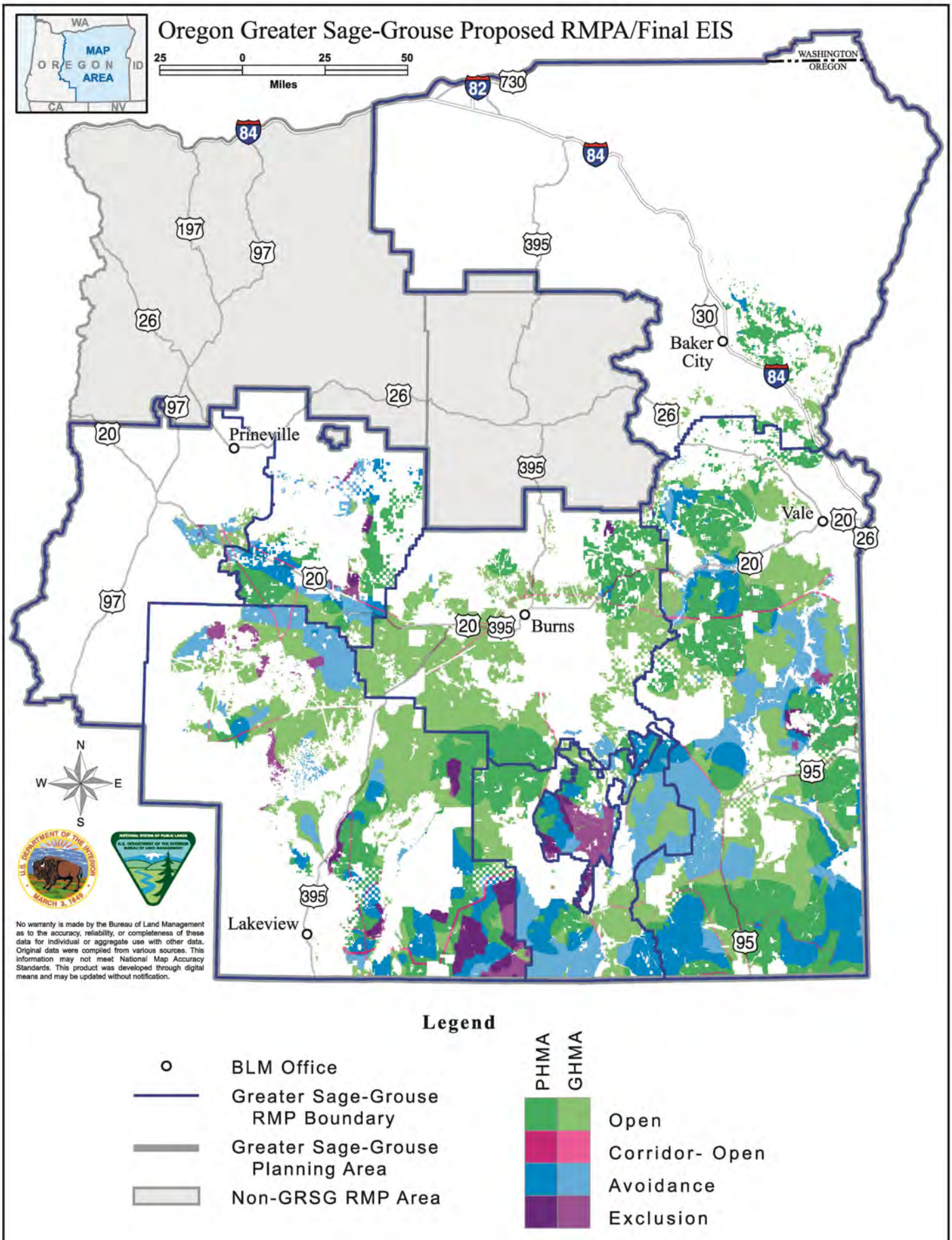

Figure 2-12: Right-of-Way Designations in the Planning Area Alternative A (No Action)

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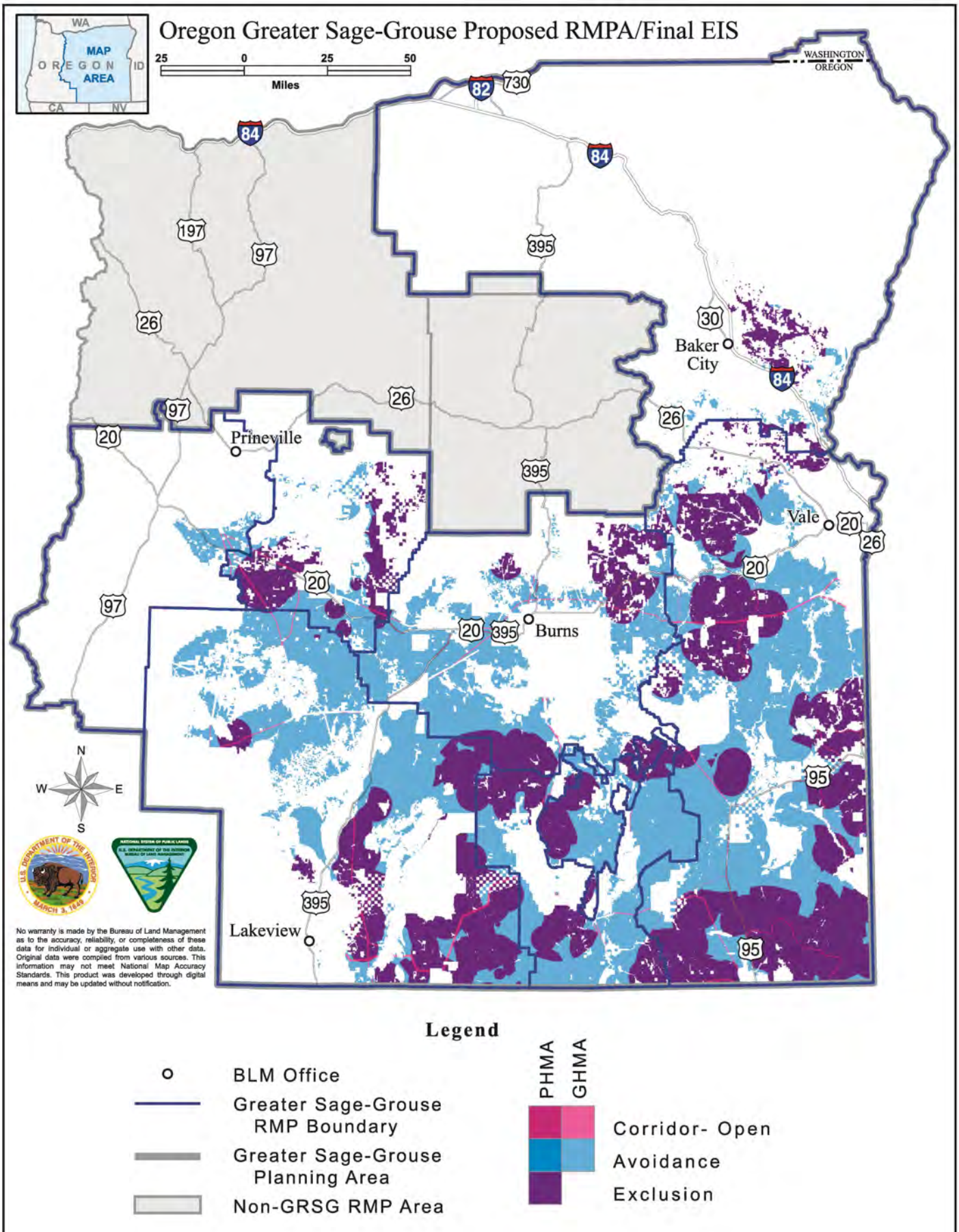

Figure 2-13: Right-of-Way Designations in the Planning Area Alternative B

M14-06-03

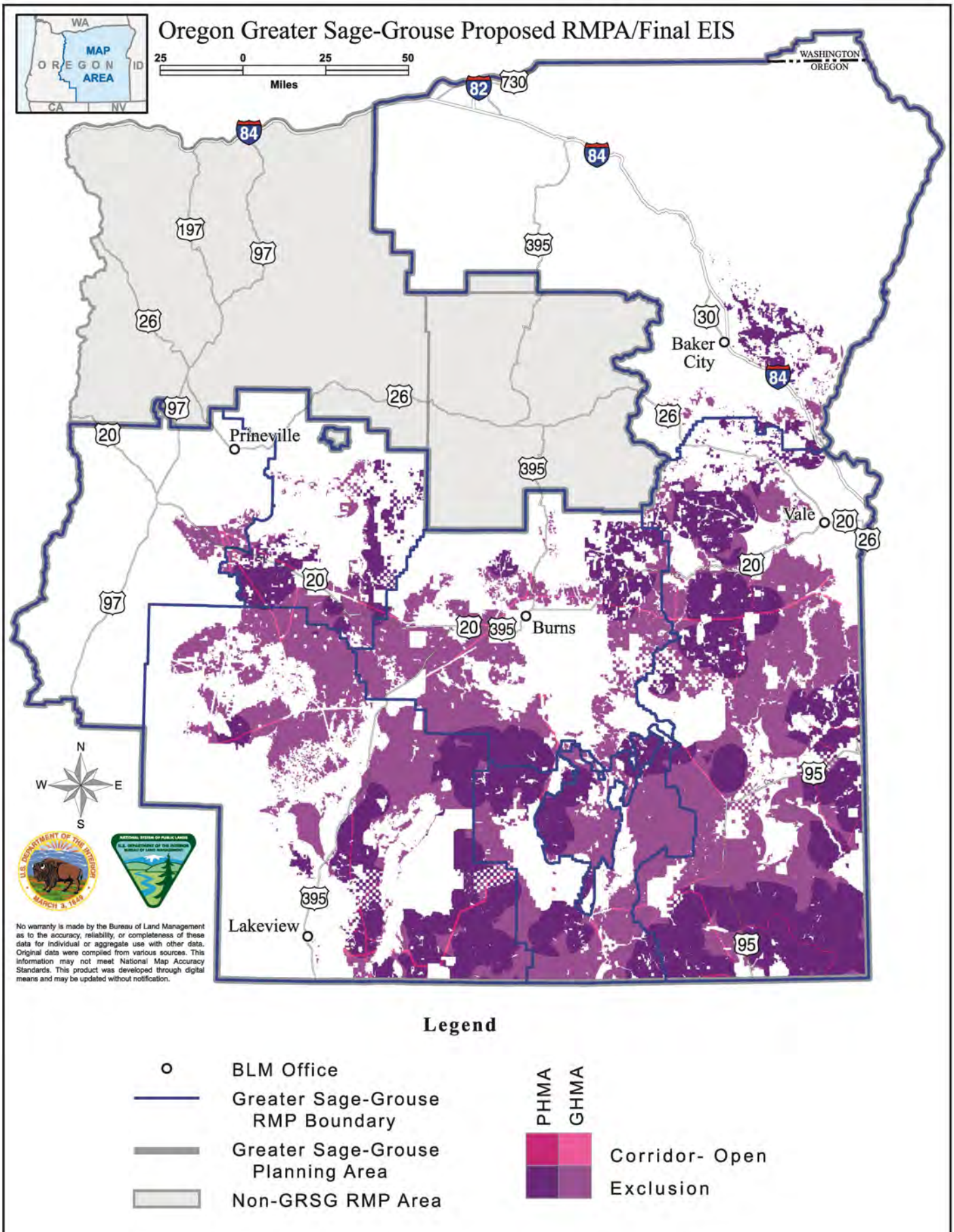

Figure 2-14: Right-of-Way Designations in the Planning Area Alternative C

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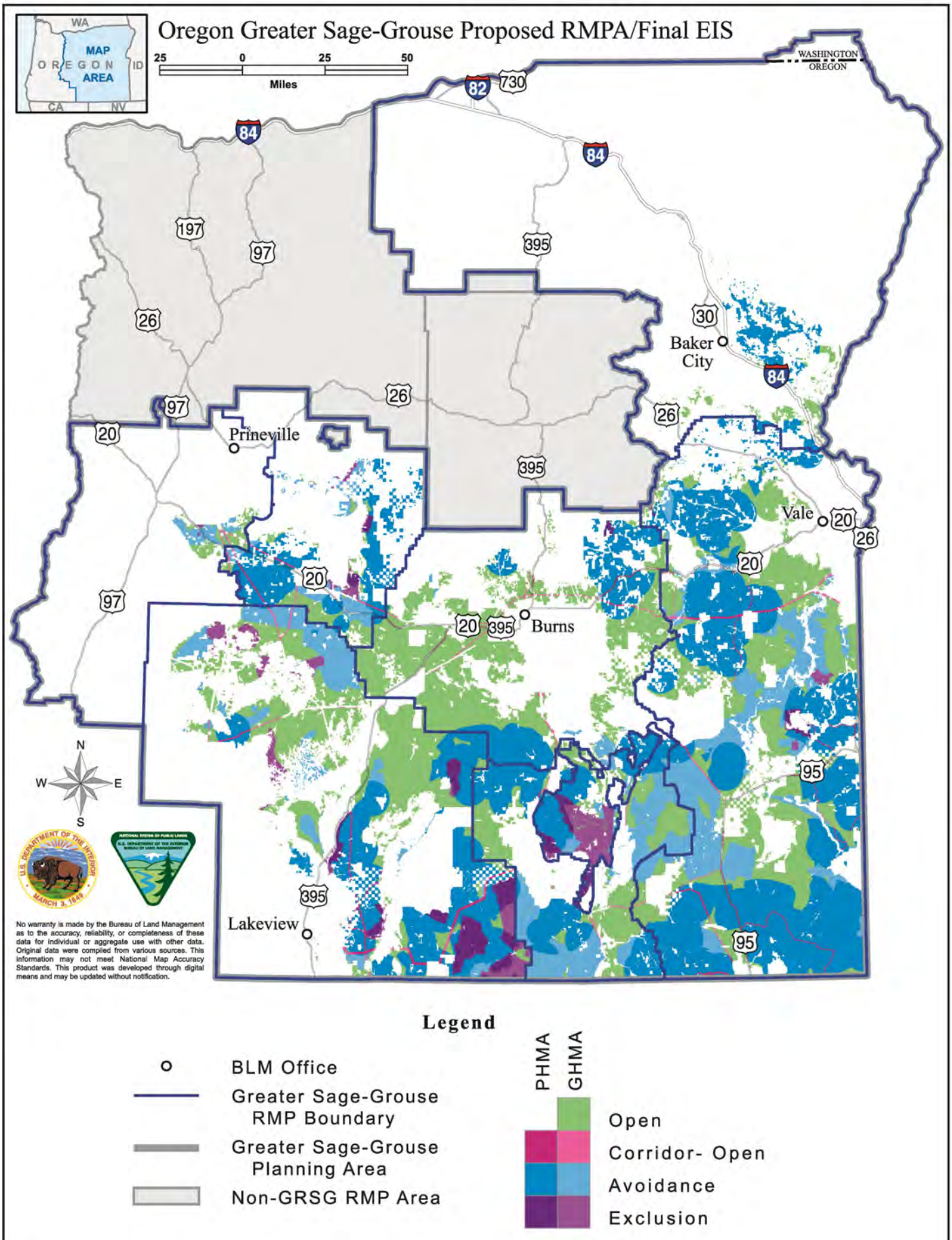

Figure 2-15: Right-of-Way Designations in the Planning Area Alternative D

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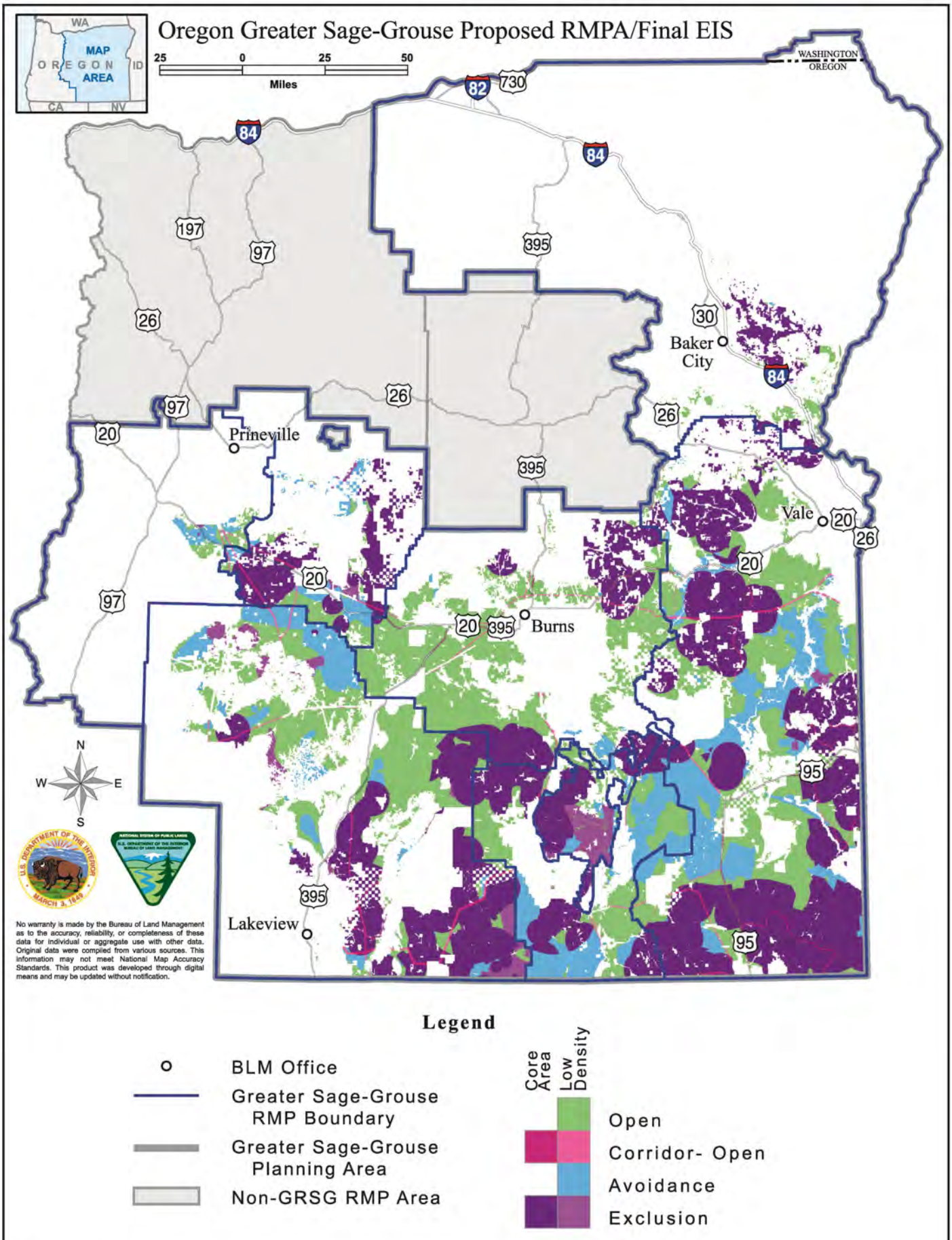

Figure 2-16: Right-of-Way Designations in the Planning Area Alternative E

M14-06-03

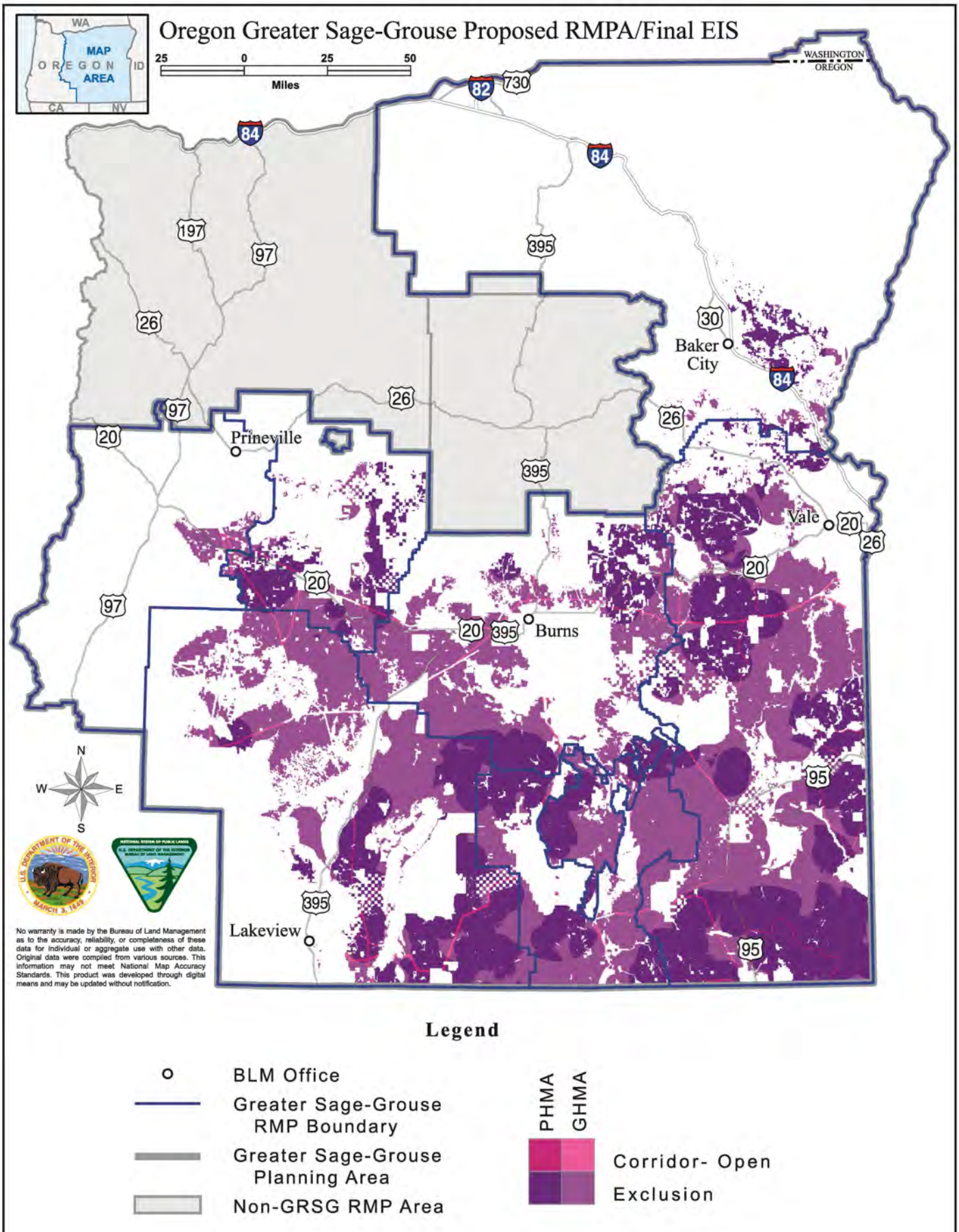

Figure 2-17: Right-of-Way Designations in the Planning Area Alternative F

M14-06-03

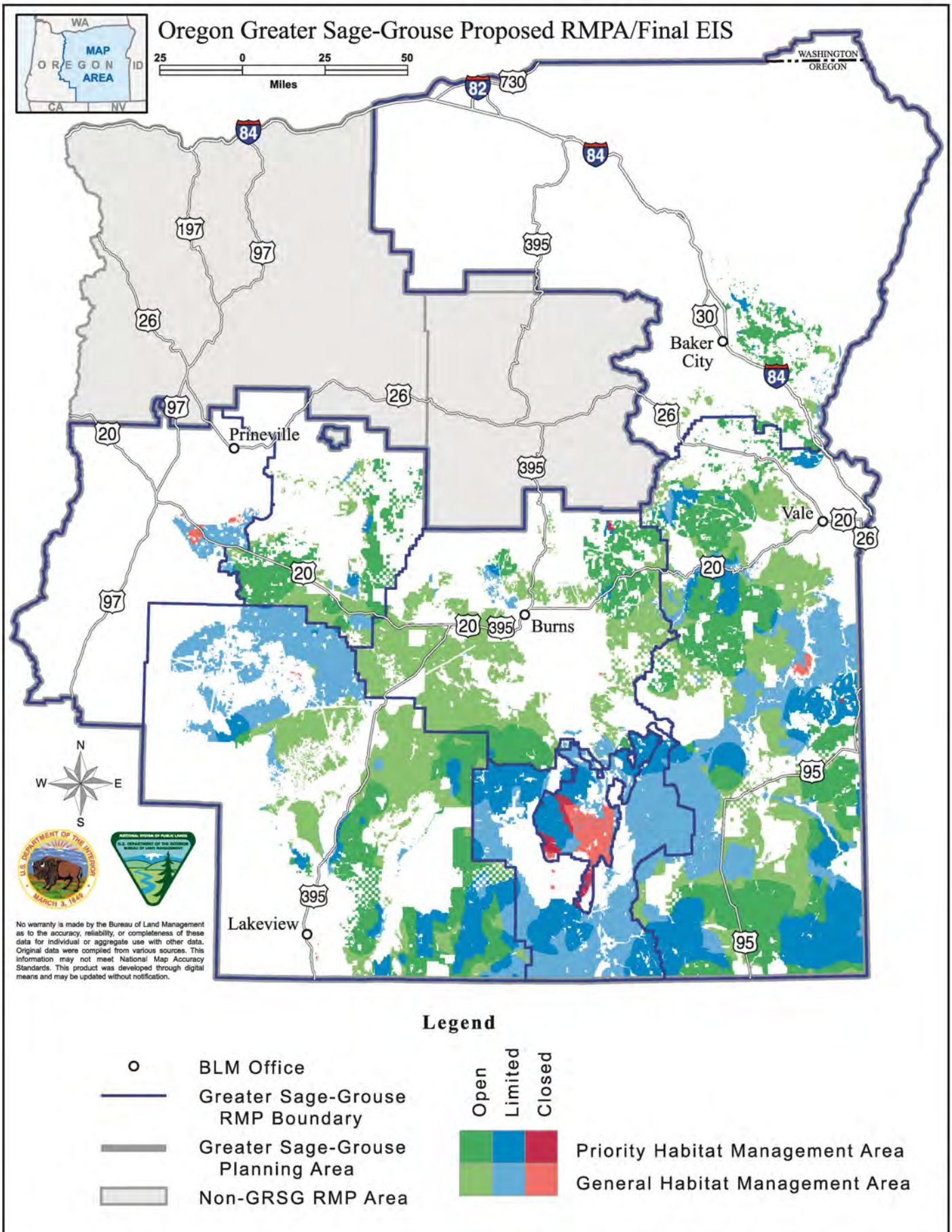

Figure 2-18: Off-Highway Vehicle Designations in the Planning Area Alternative A (No Action)

M14-06-03

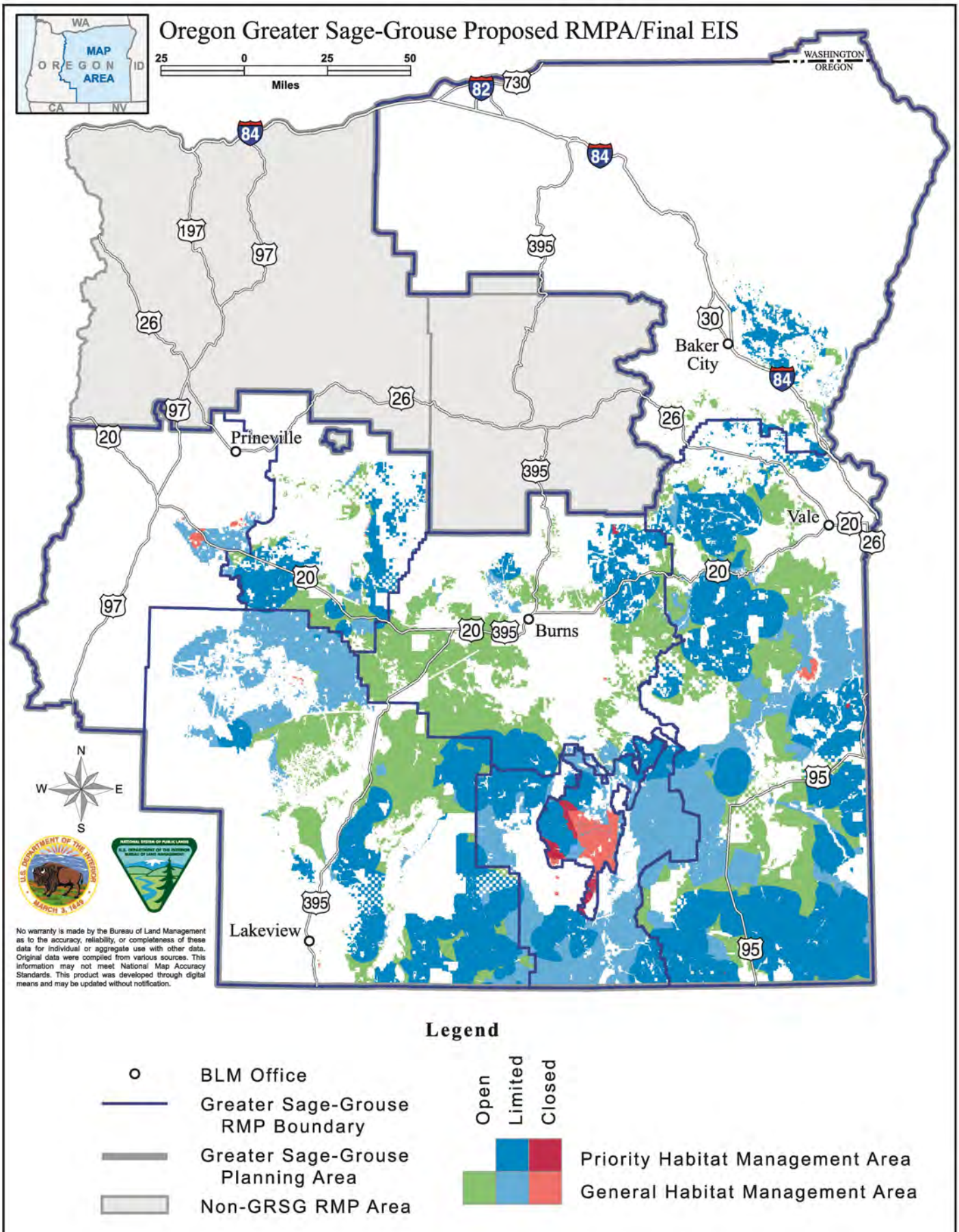

Figure 2-19: Off-Highway Vehicle Designations in the Planning Area Alternatives B, D, and F

M14-06-03

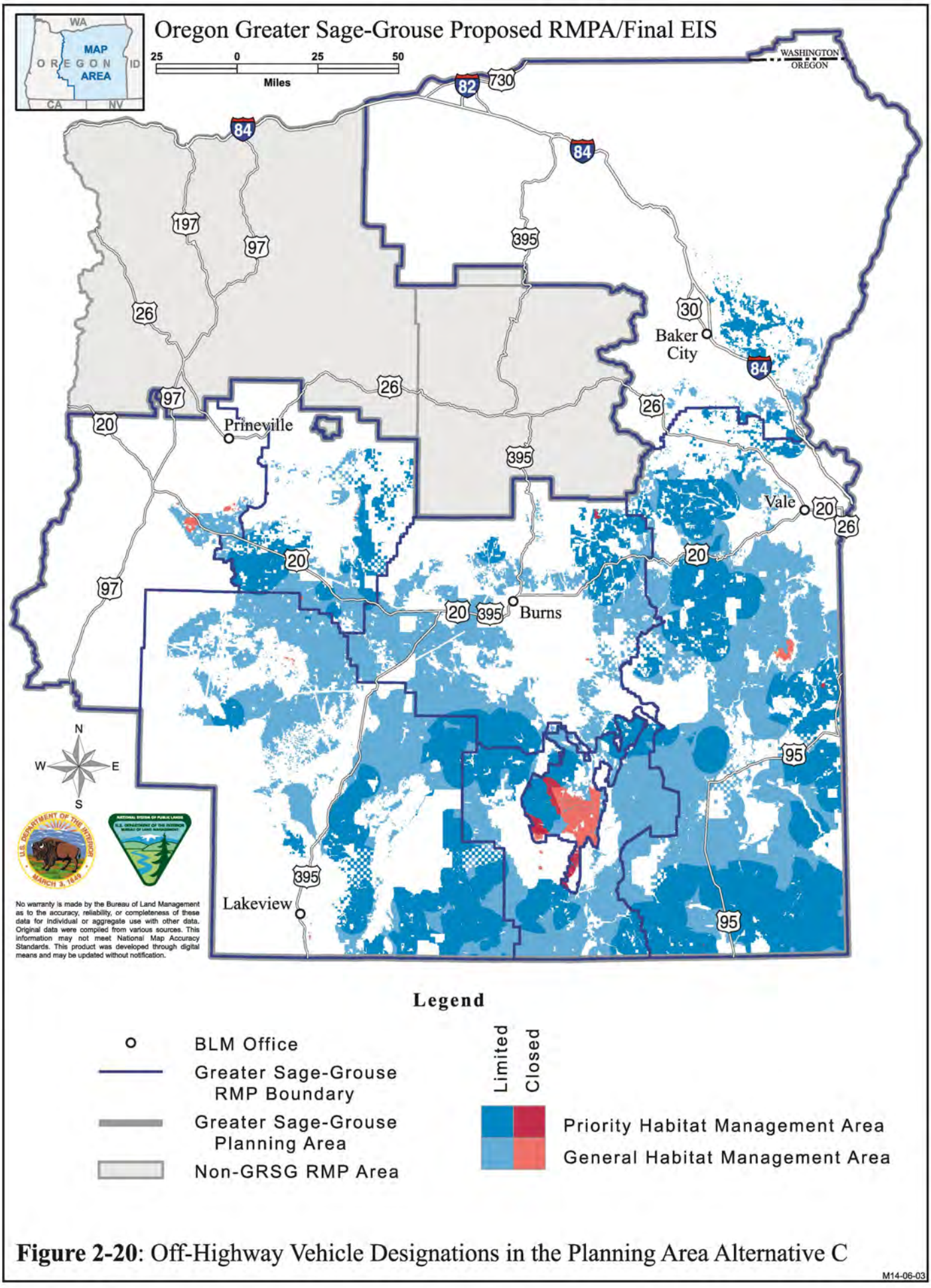

Figure 2-20: Off-Highway Vehicle Designations in the Planning Area Alternative C

M14-06-03

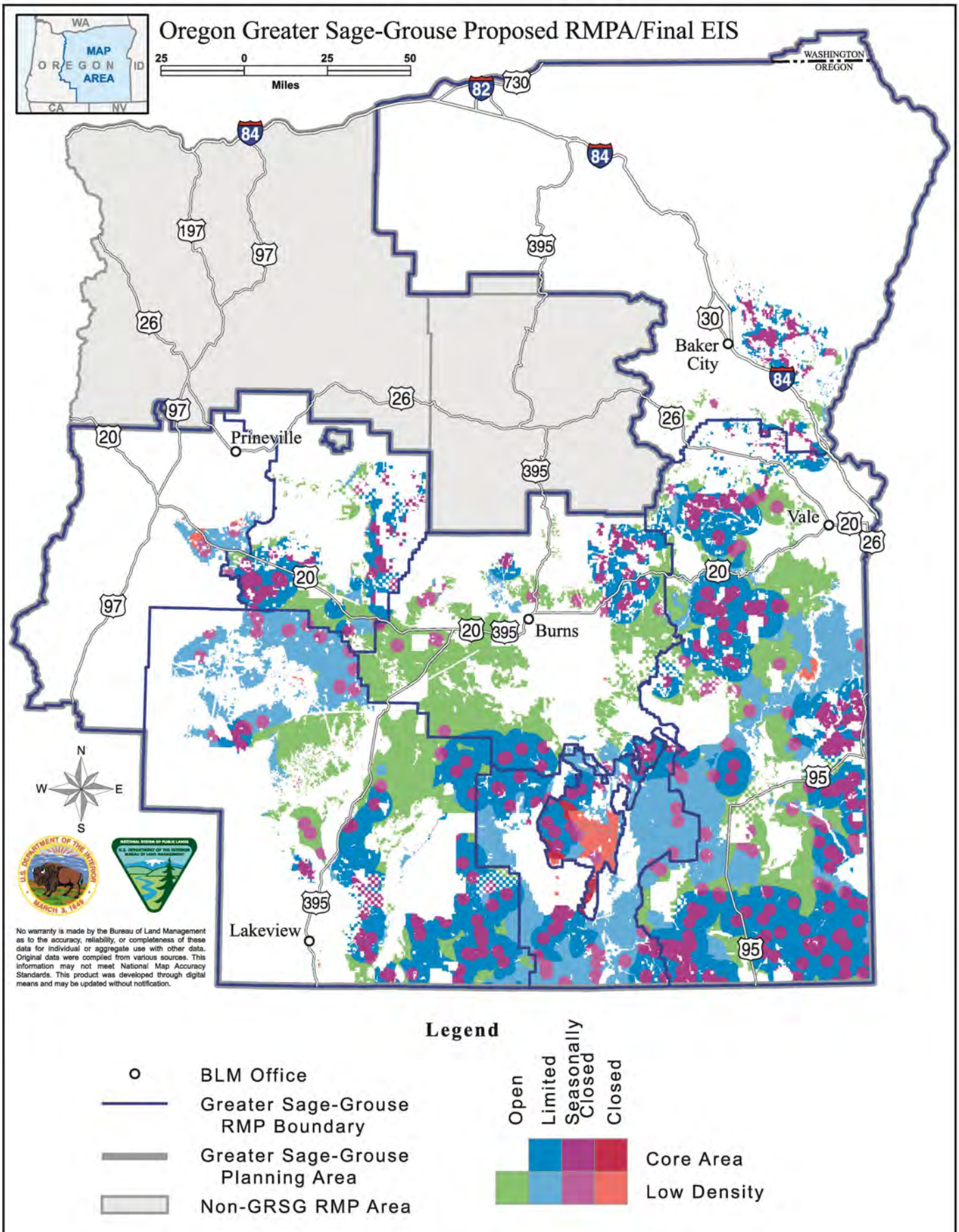

Figure 2-21: Off-Highway Vehicle Designations in the Planning Area Alternative E

M14-06-03

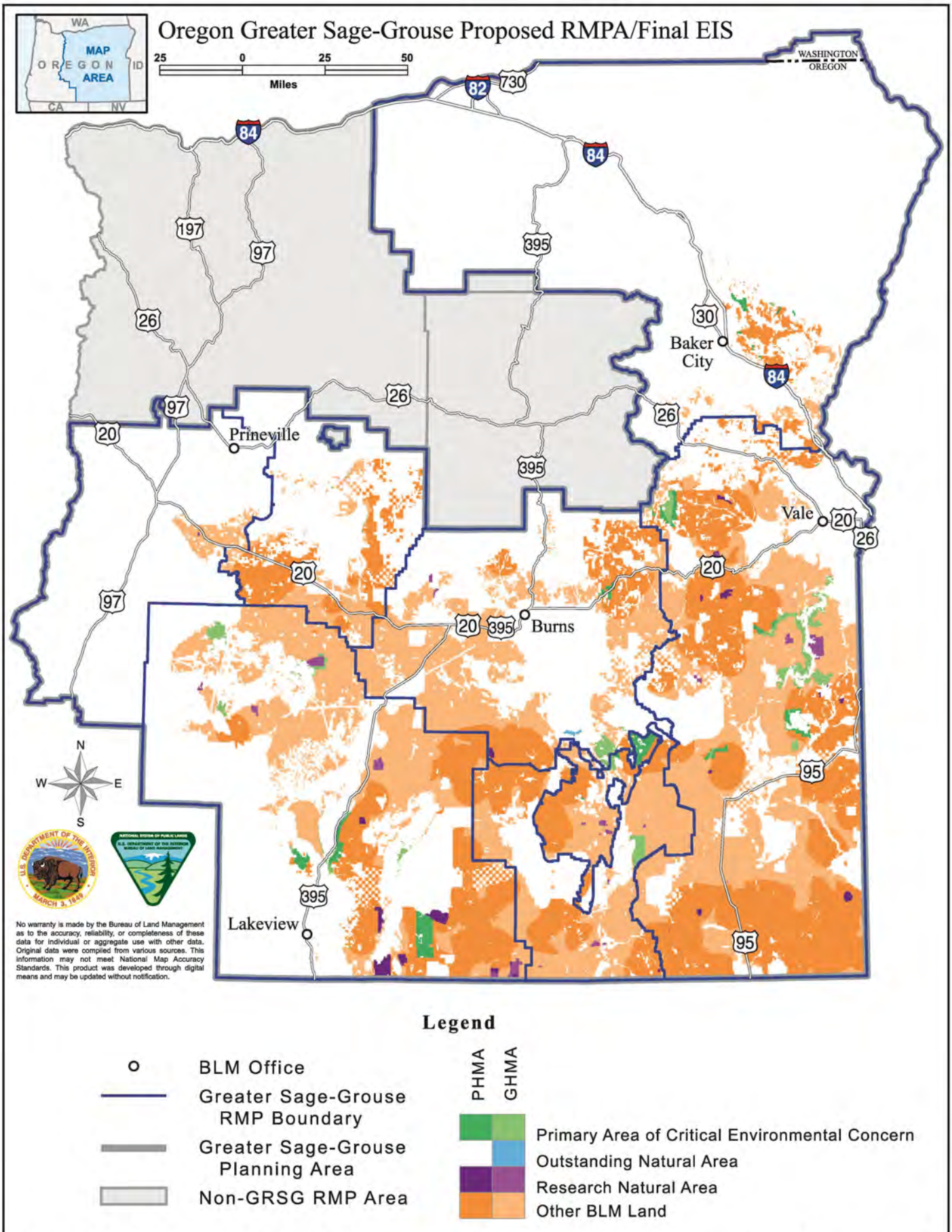

Figure 2-22: Areas of Critical Environmental Concern in the Planning Area Alternatives A (No Action), B, D, and E

M14-06-03

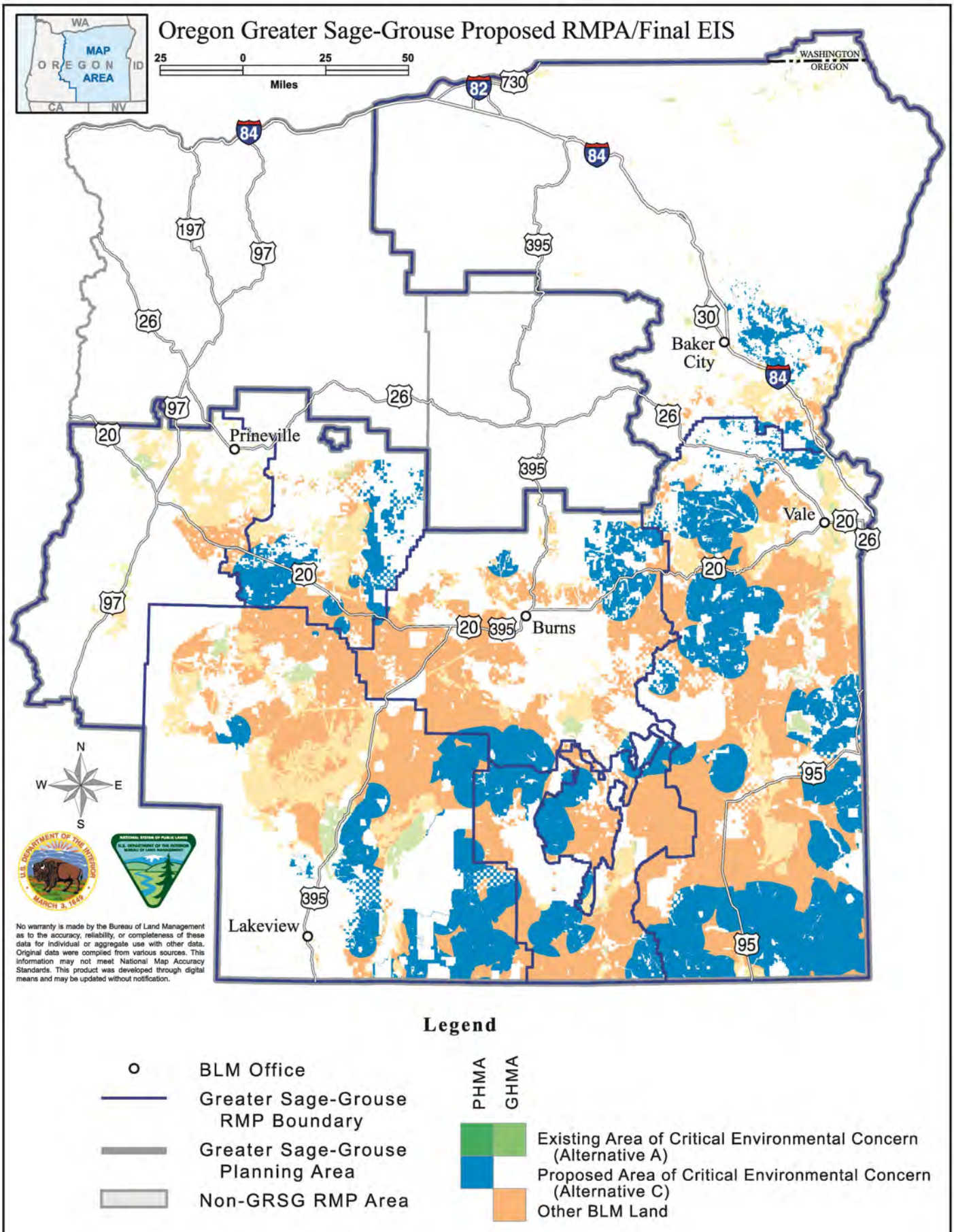

Figure 2-23: Areas of Critical Environmental Concern in the Planning Area Alternative C

M14-06-03

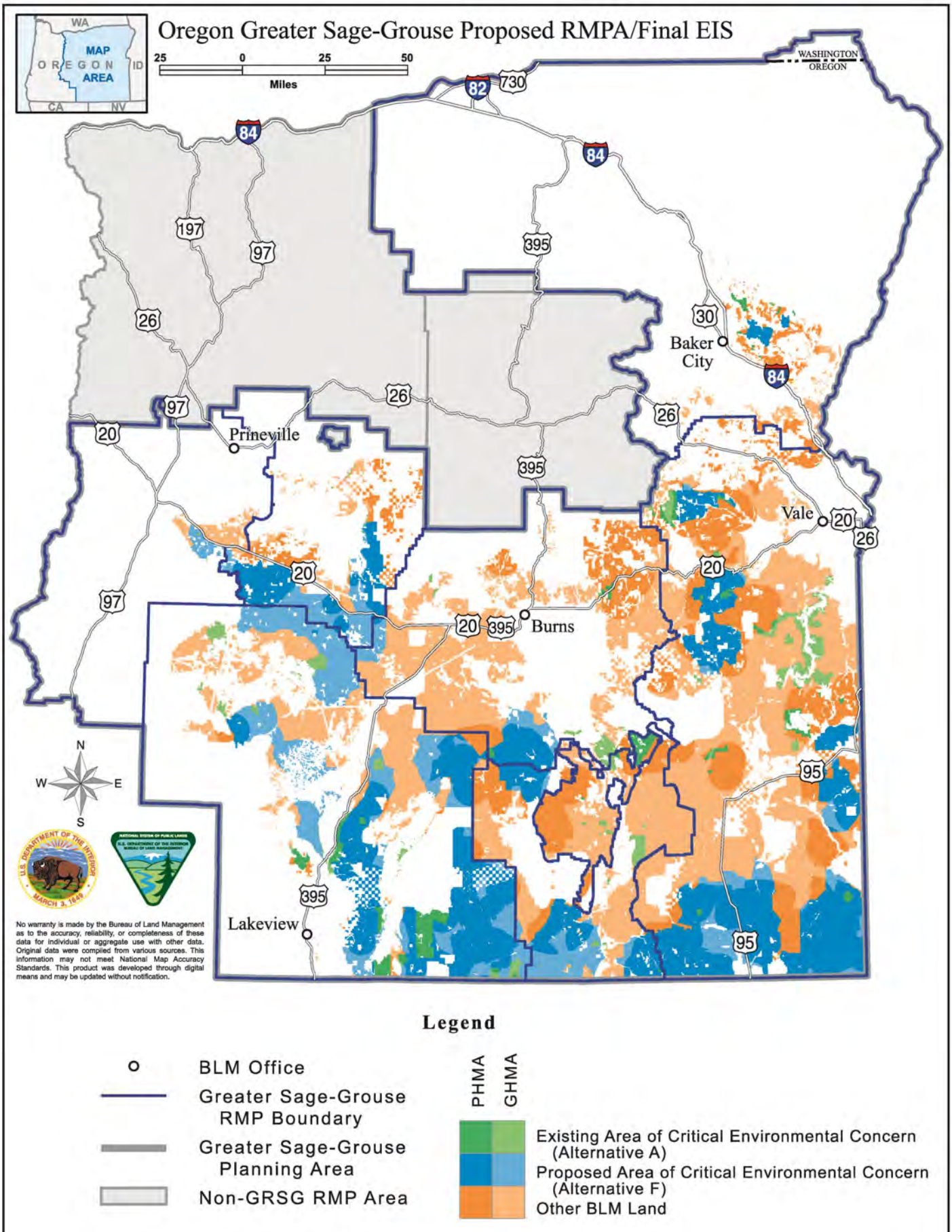

Figure 2-24: Areas of Critical Environmental Concern in the Planning Area Alternative F

M14-06-03

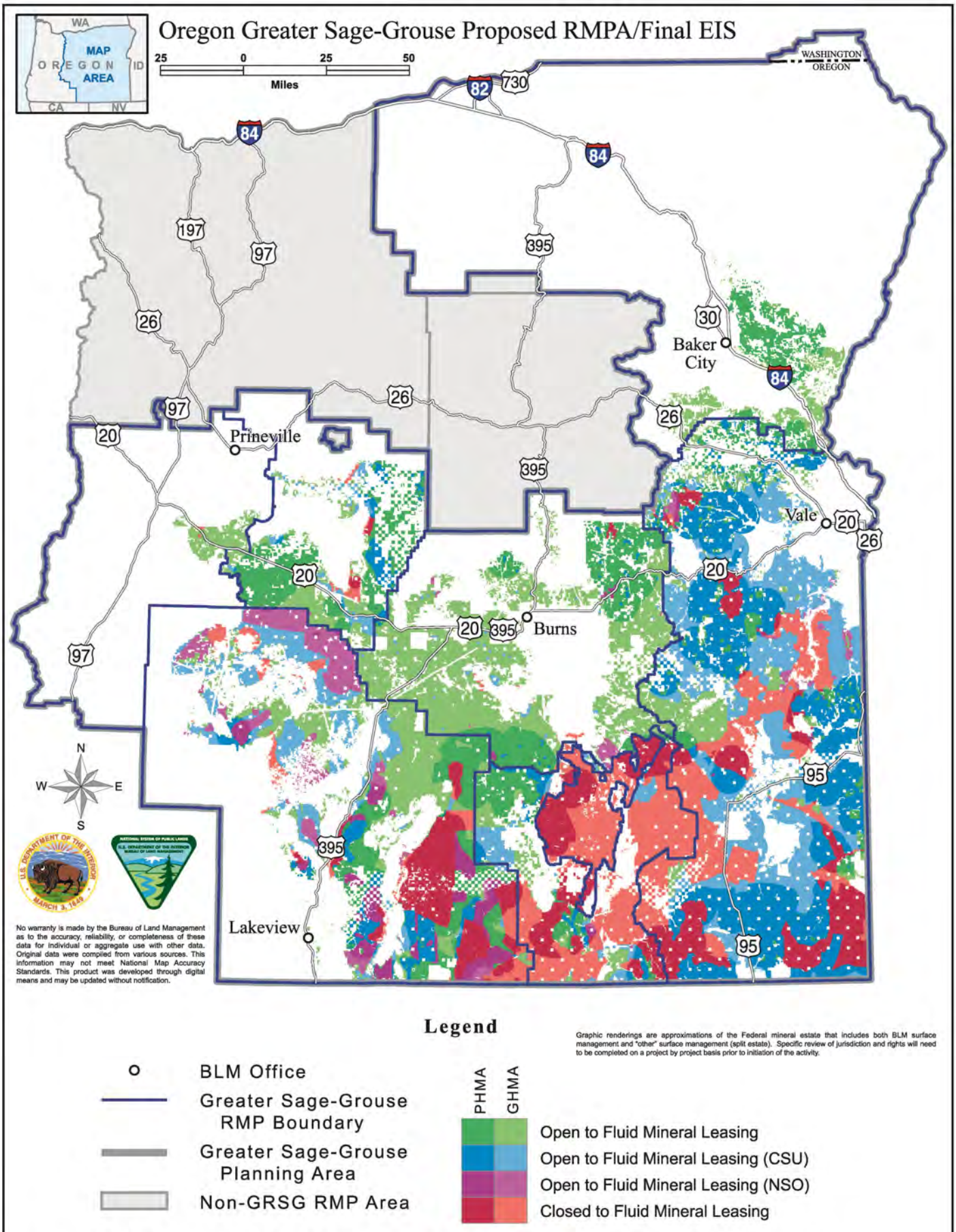

Figure 2-25: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative A (No Action)

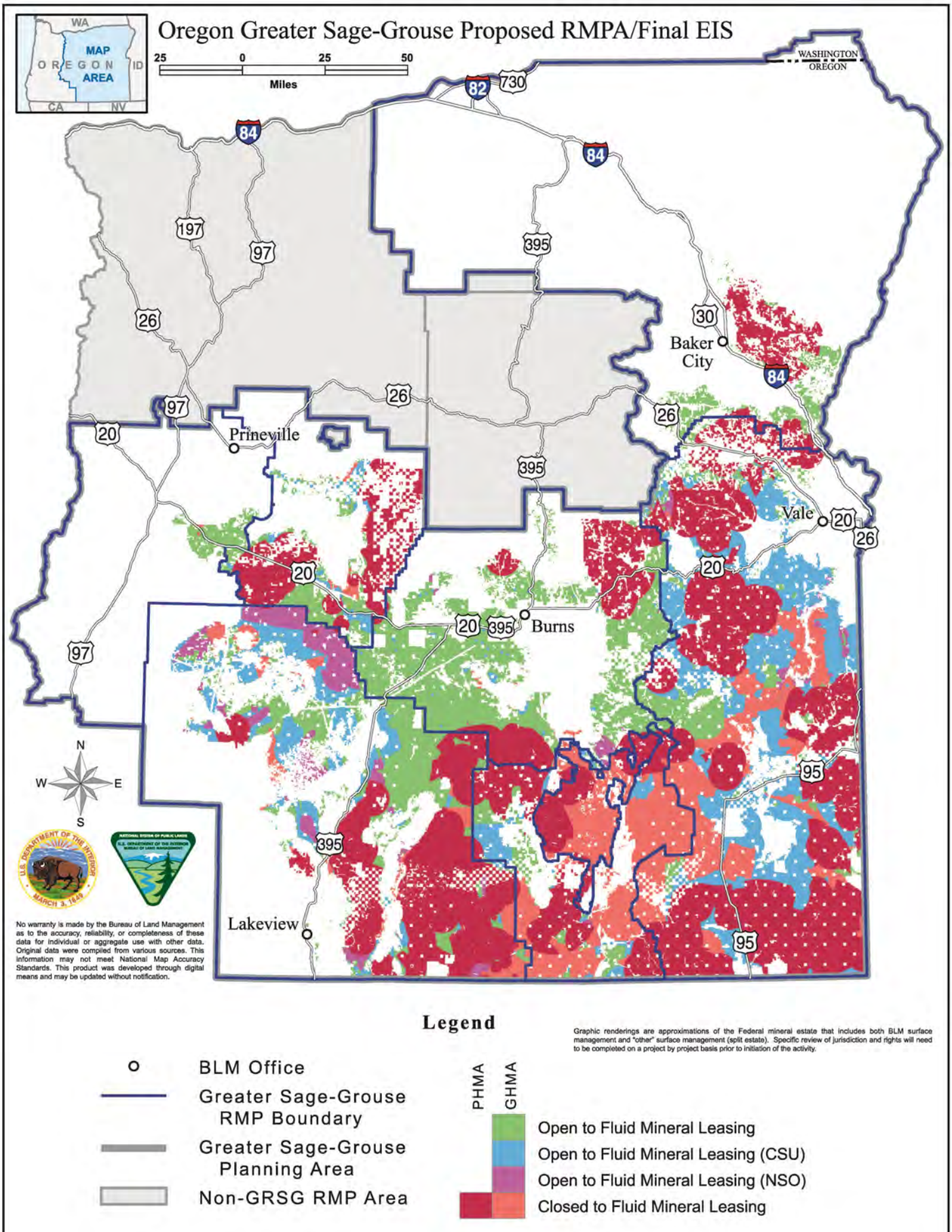

Figure 2-26: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative B

M14-06-03

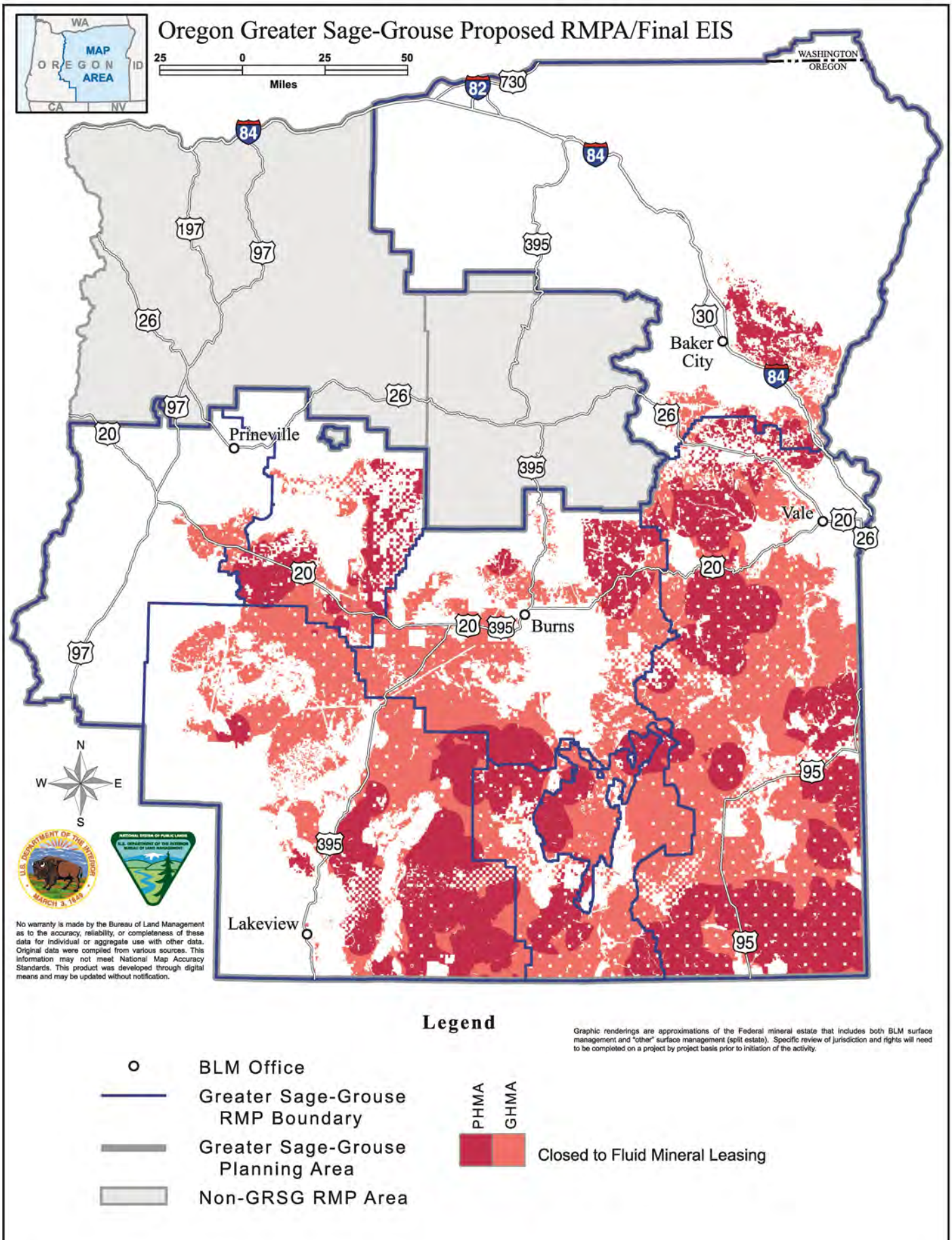

Figure 2-27: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative C

M14-06-03

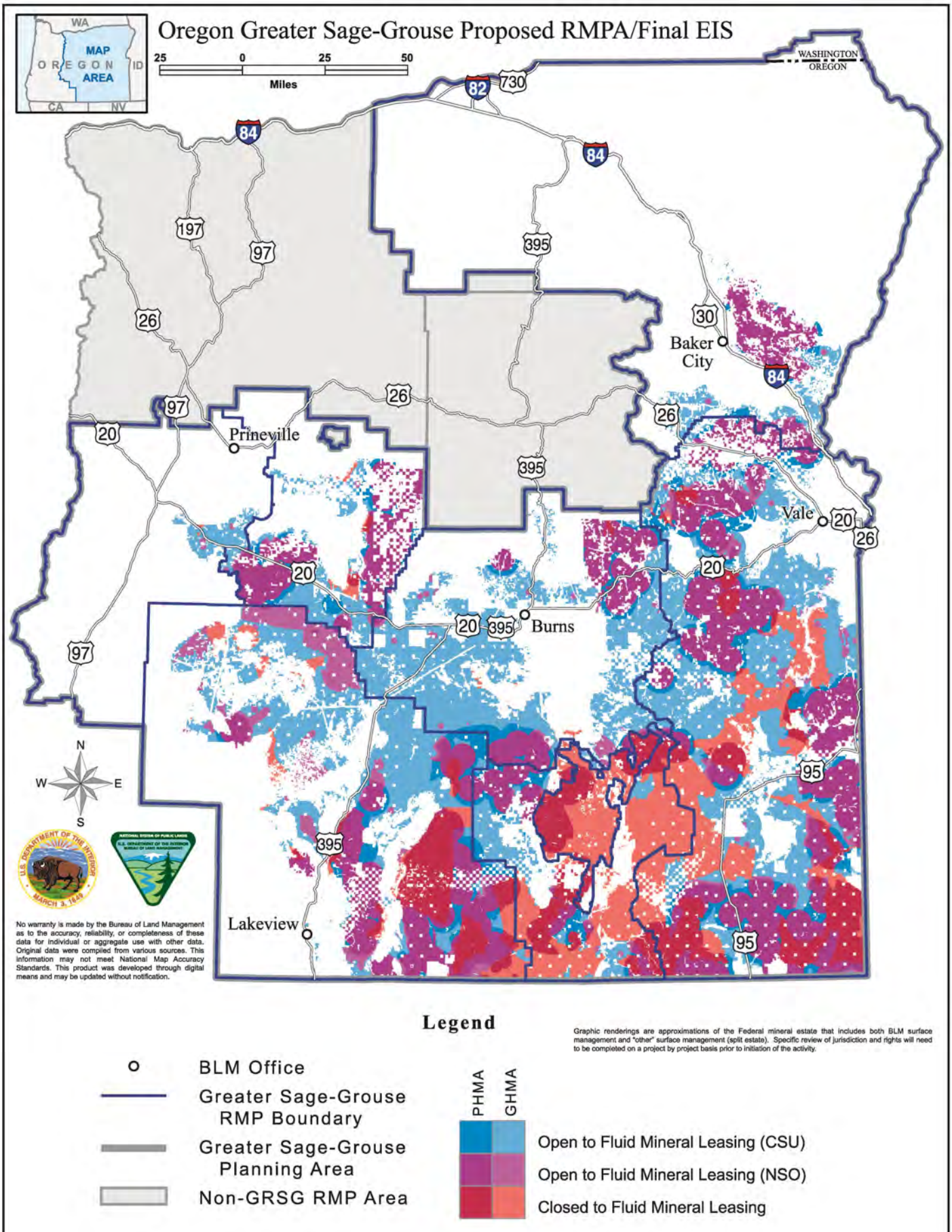

Figure 2-28: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative D

M14-06-03

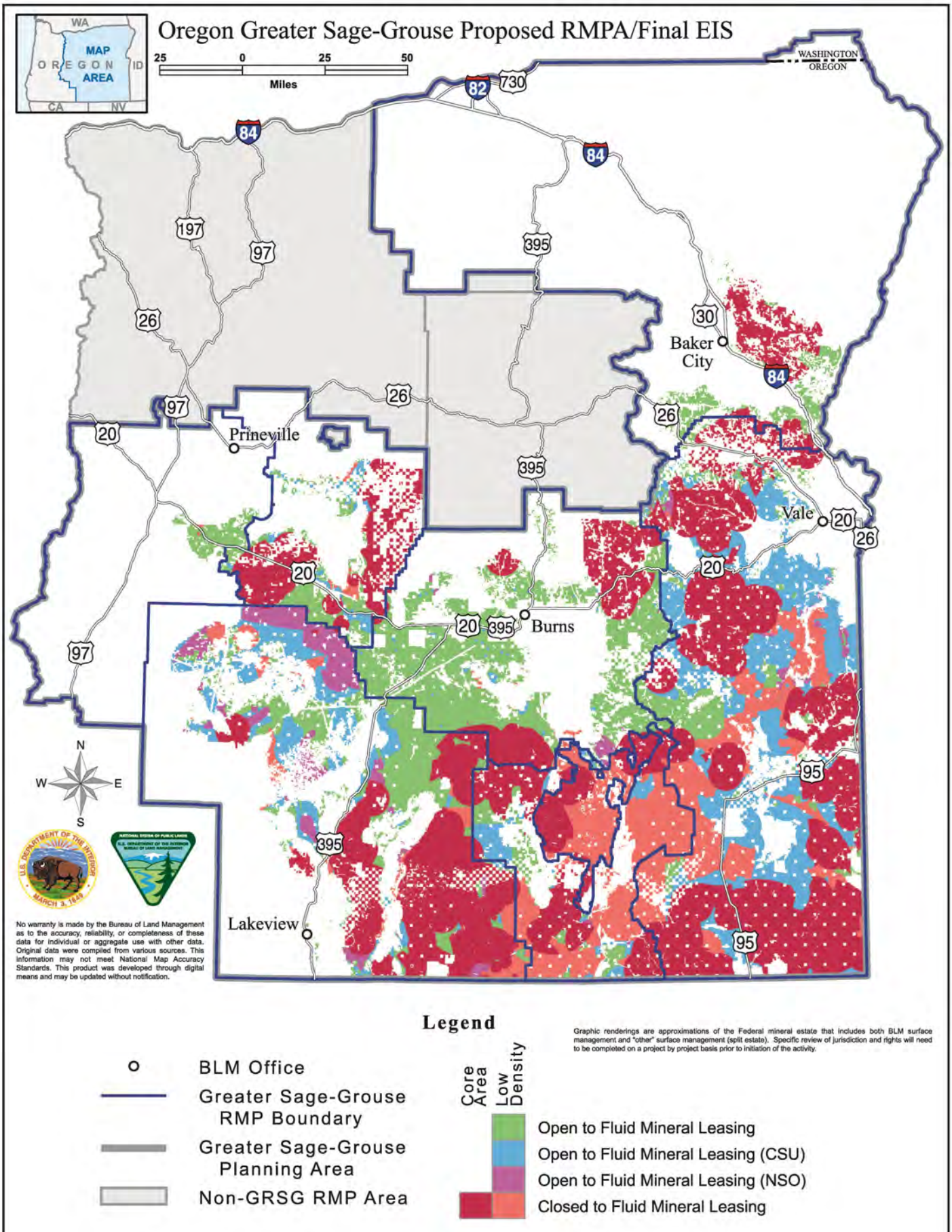

Figure 2-29: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative E

M14-06-03

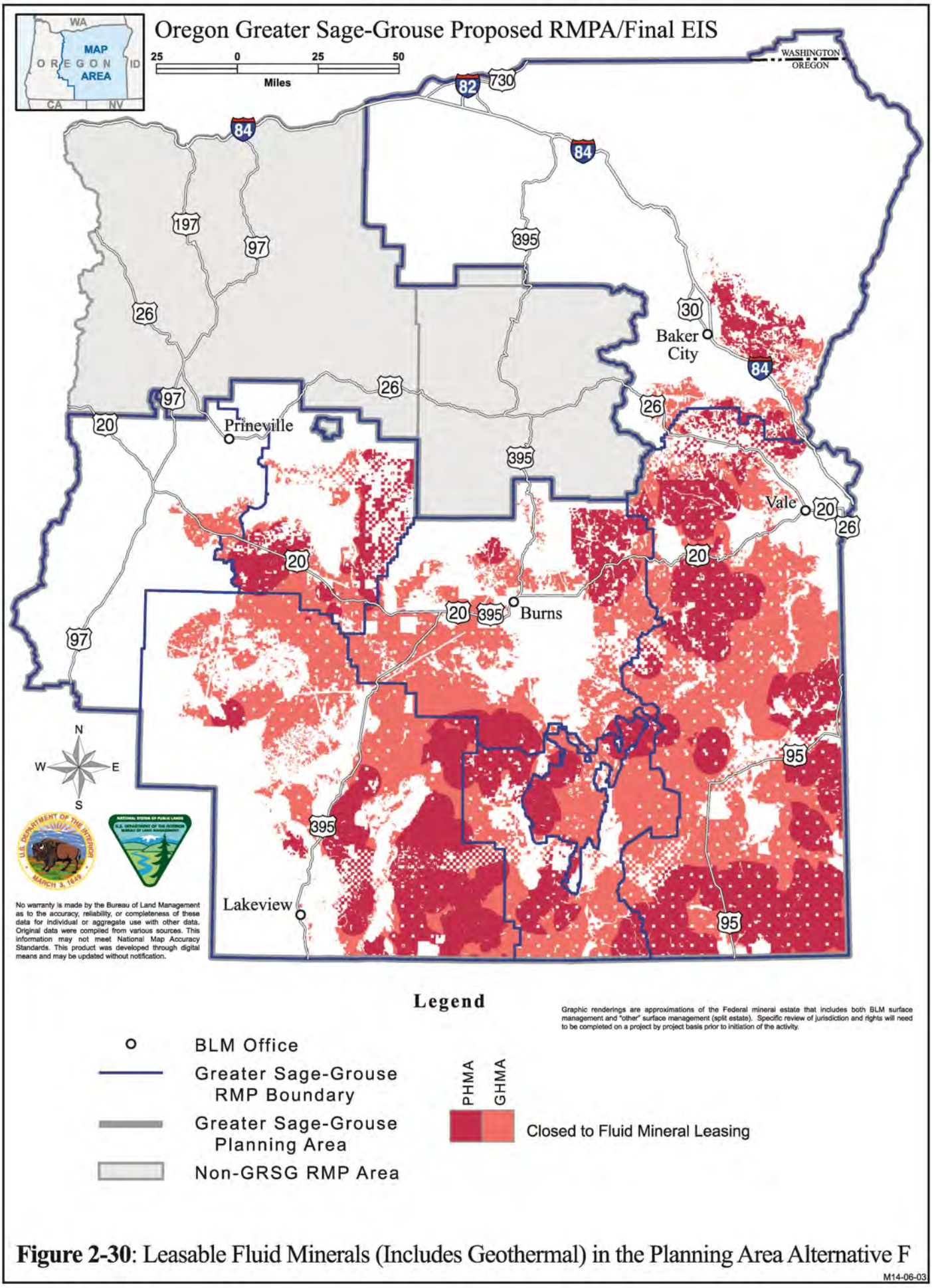

Figure 2-30: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Alternative F

M14-06-03

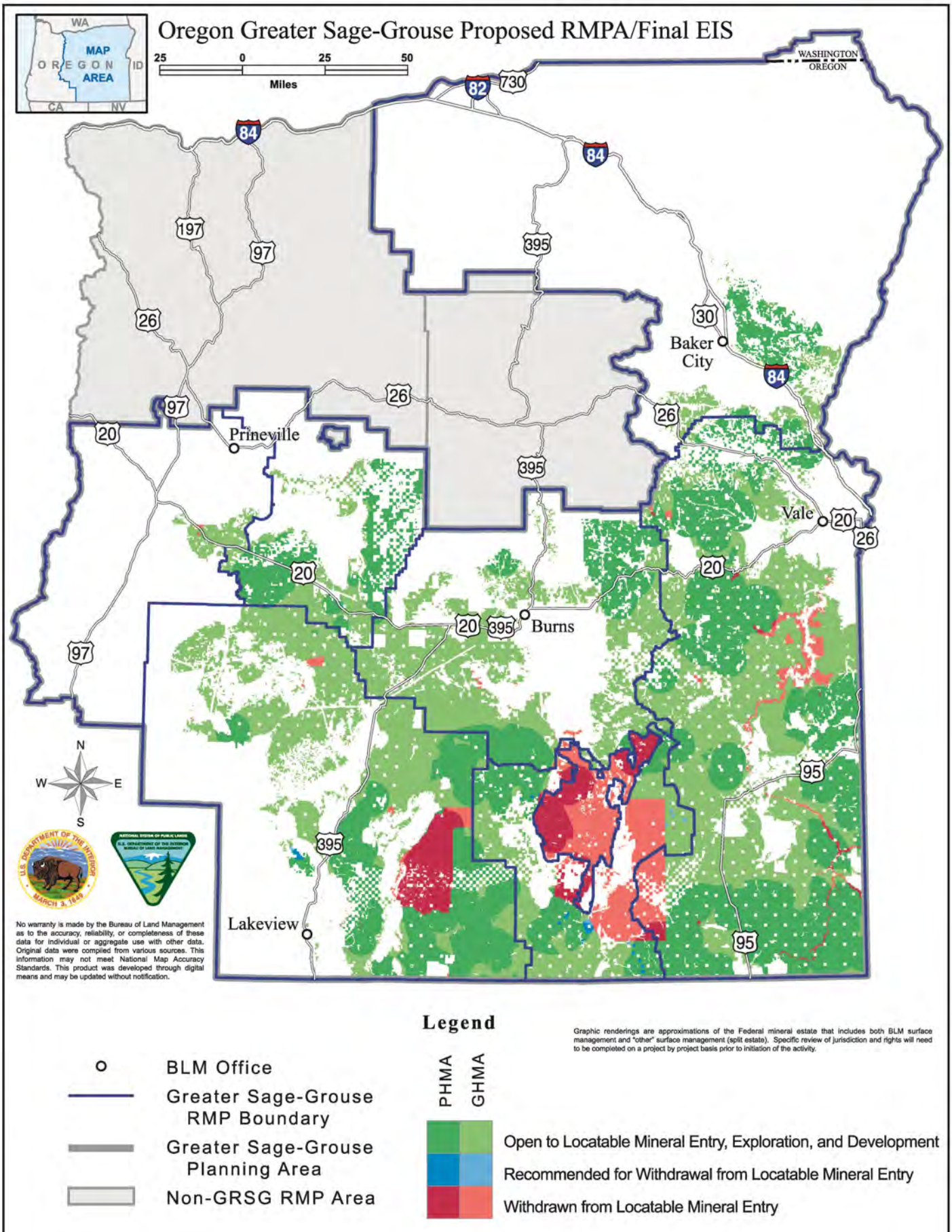

Figure 2-31: Locatable Minerals in the Planning Area Alternative A (No Action)

M14-06-03

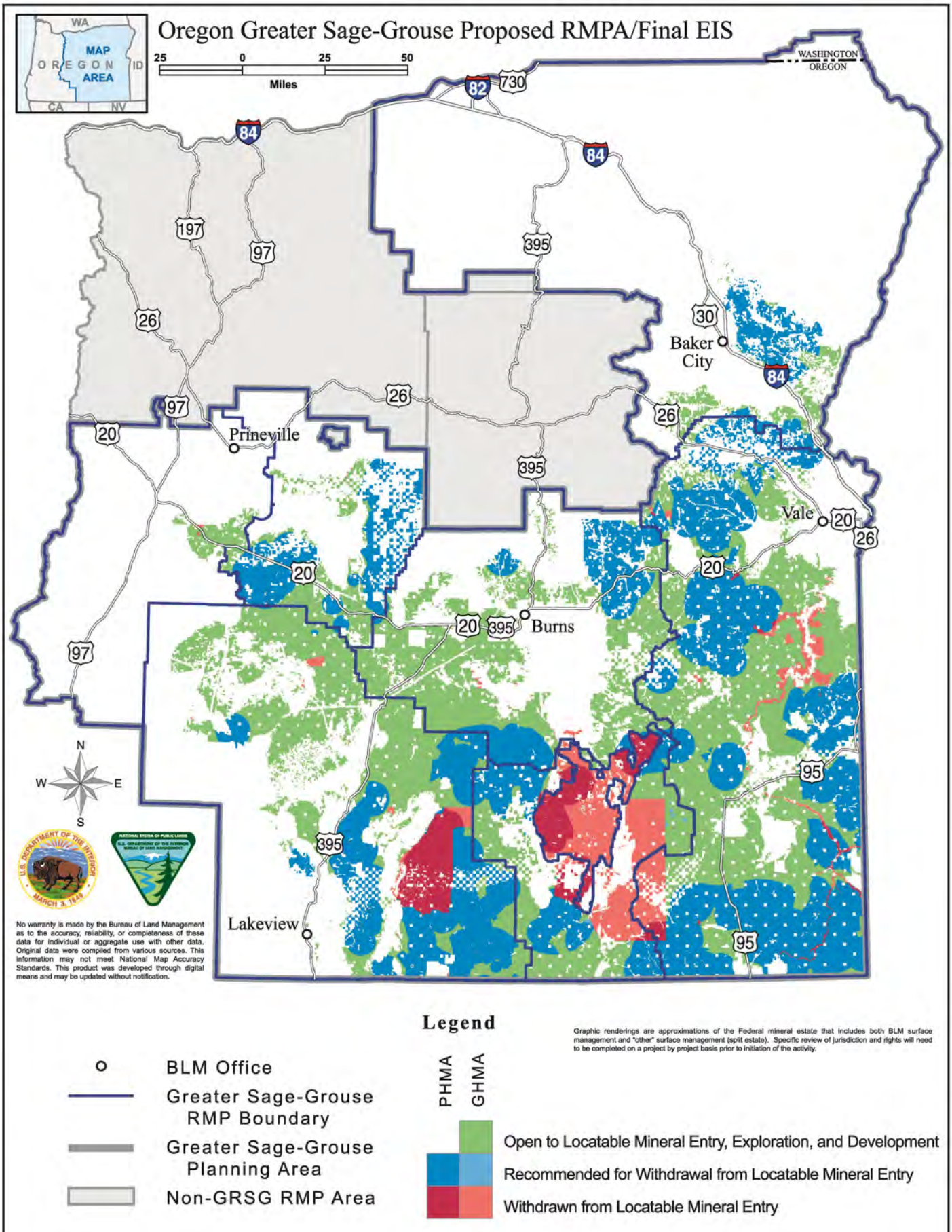

Figure 2-32: Locatable Minerals in the Planning Area Alternative B

M14-06-03

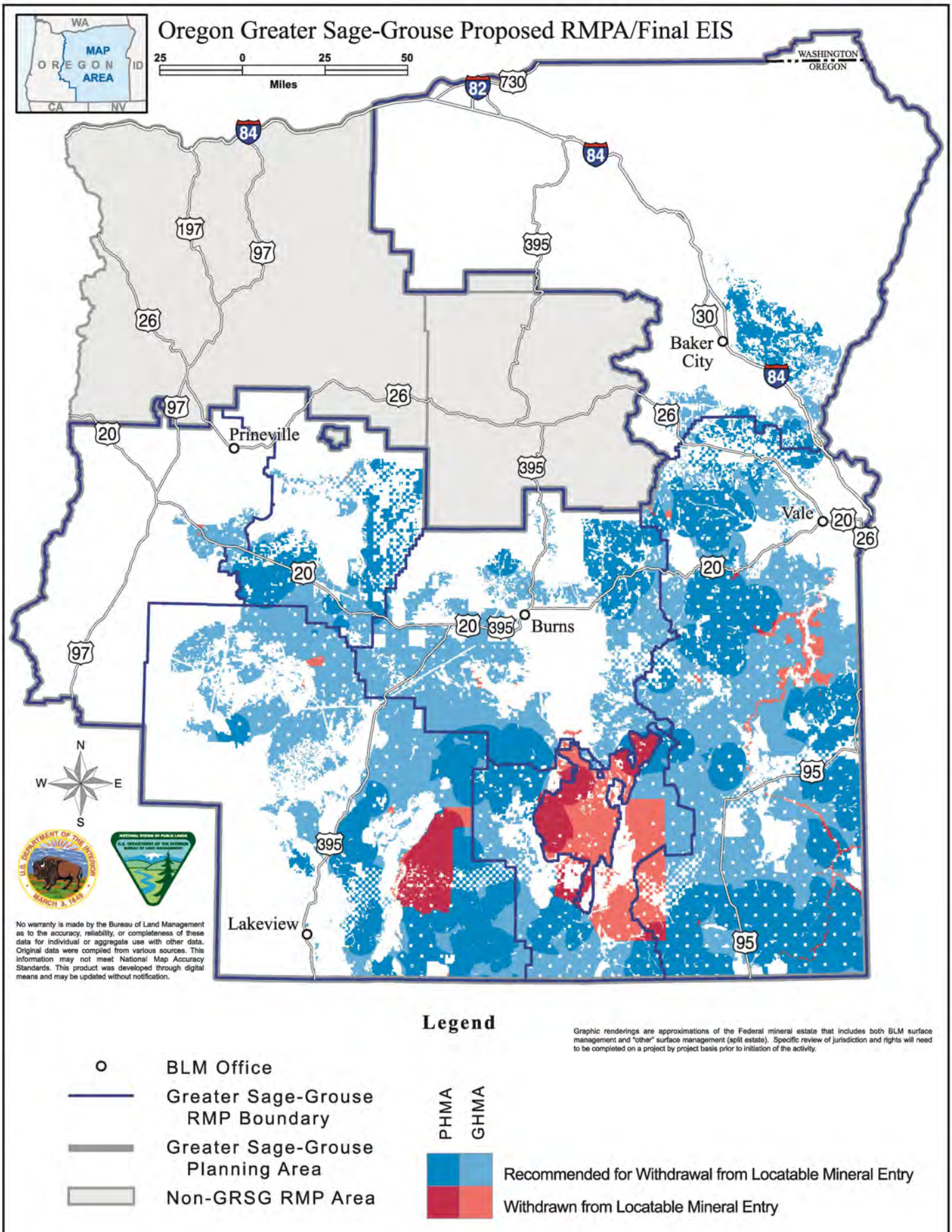

Figure 2-33: Locatable Minerals in the Planning Area Alternative C

M14-06-03

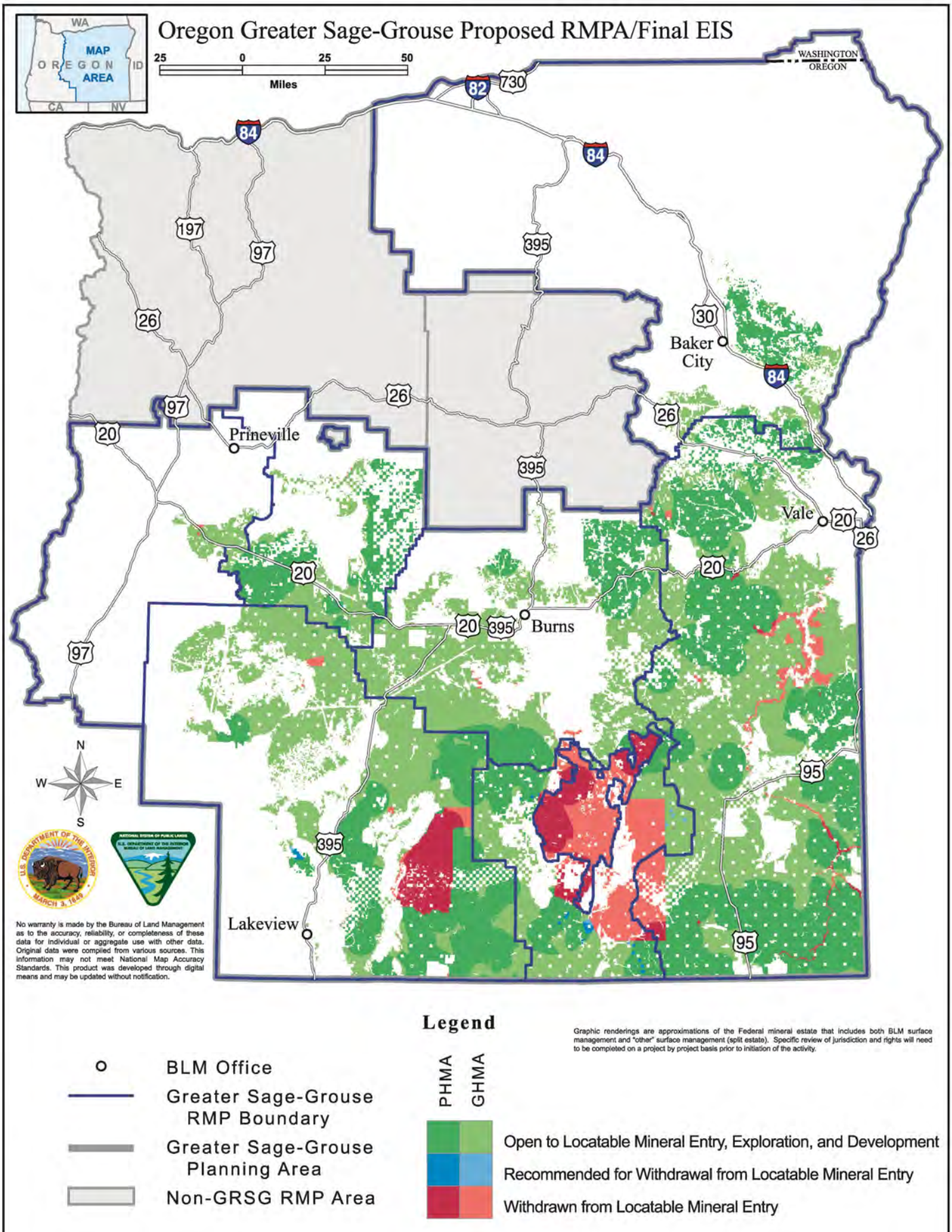

Figure 2-34: Locatable Minerals in the Planning Area Alternative D

M14-06-03

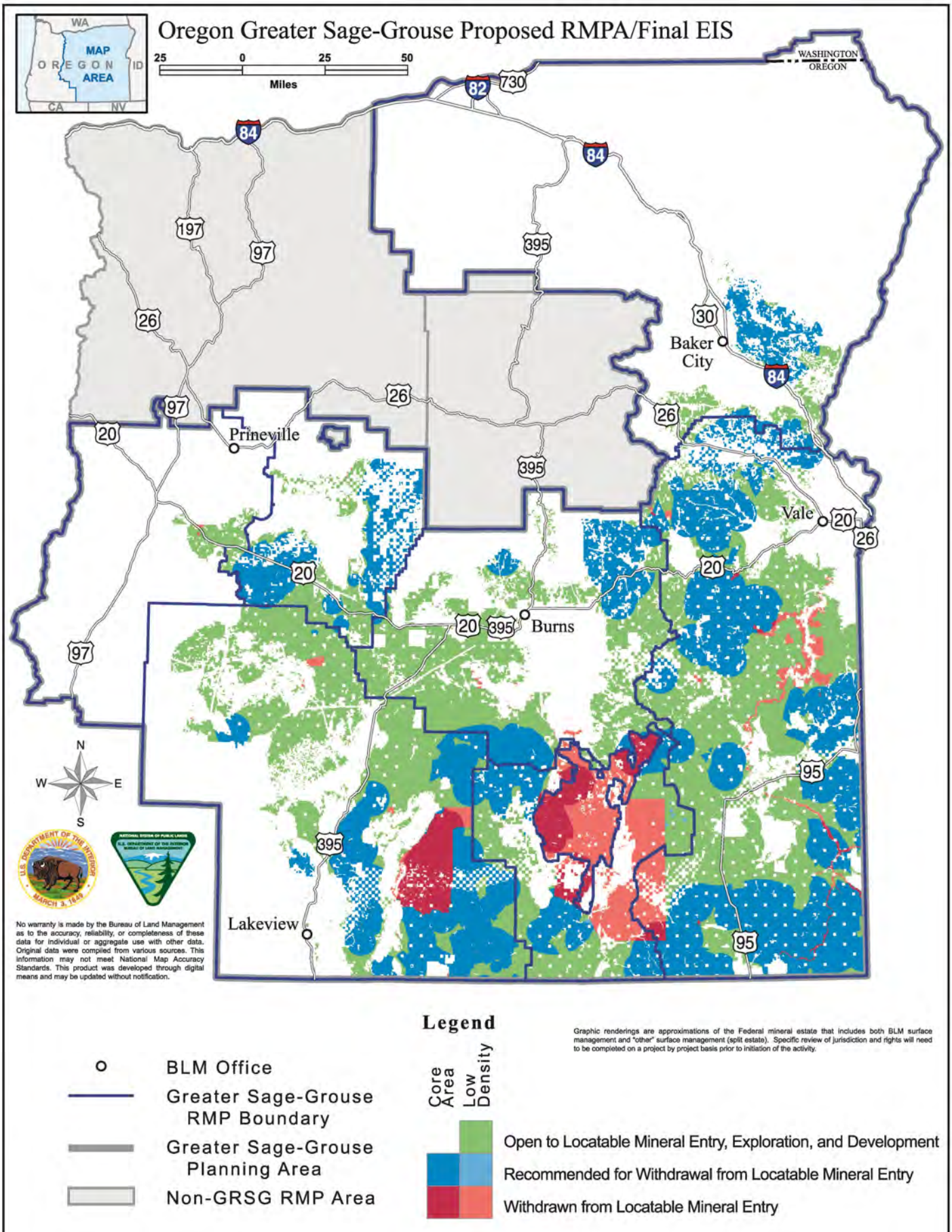

Figure 2-35: Locatable Minerals in the Planning Area Alternative E

M14-06-03

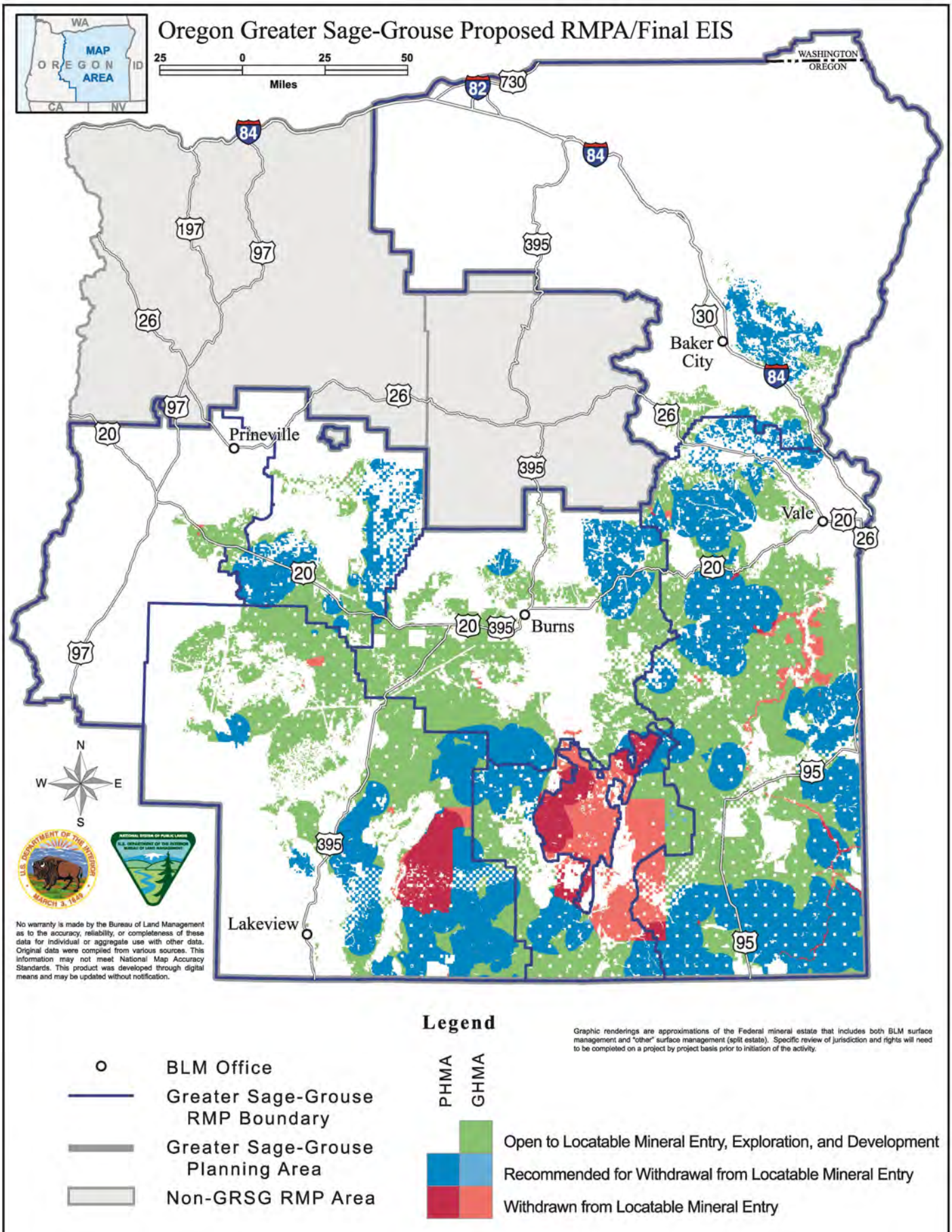

Figure 2-36: Locatable Minerals in the Planning Area Alternative F

M14-06-03

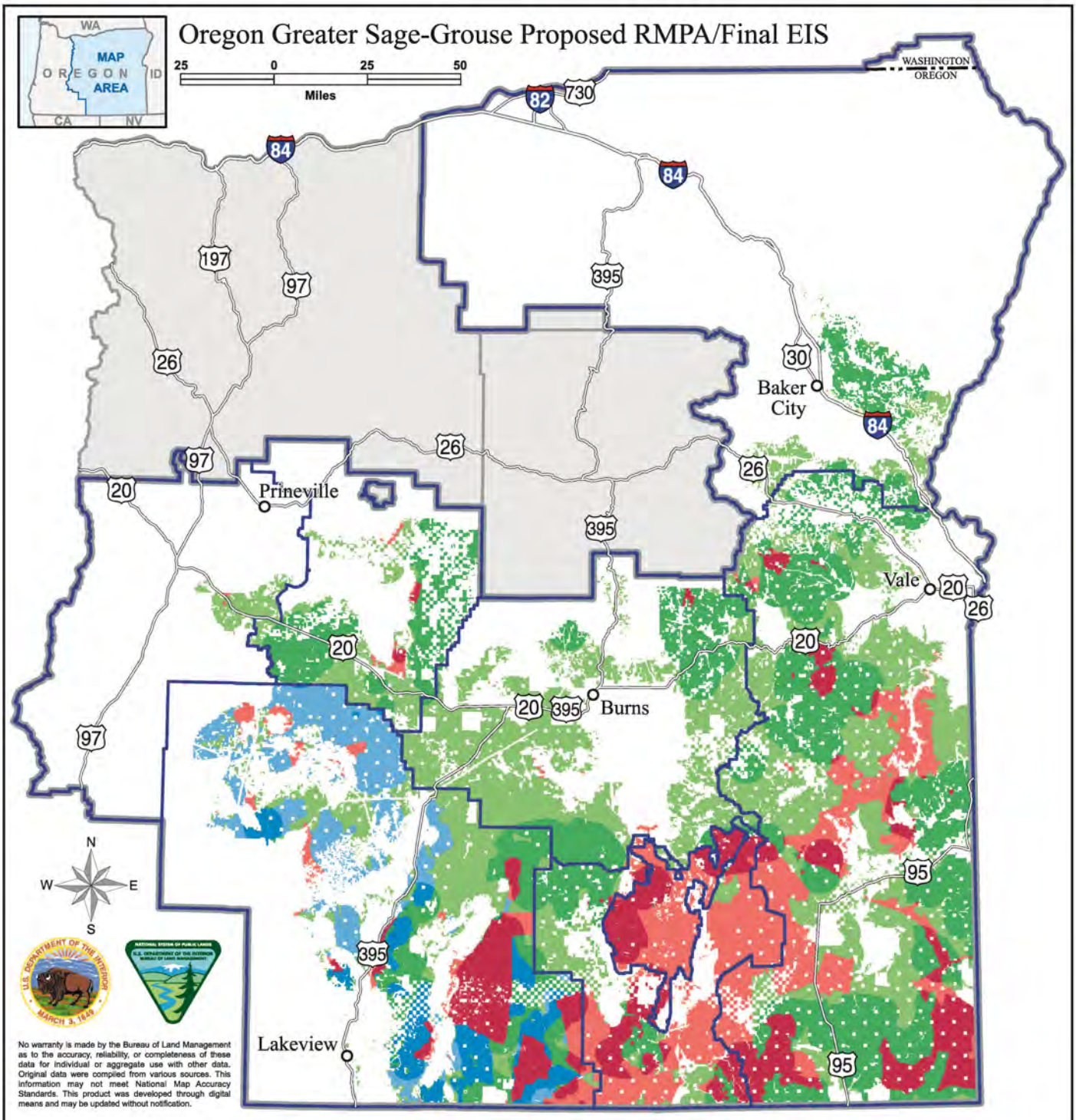

Figure 2-37: Salable Minerals in the Planning Area Alternative A (No Action)

M14-06-03

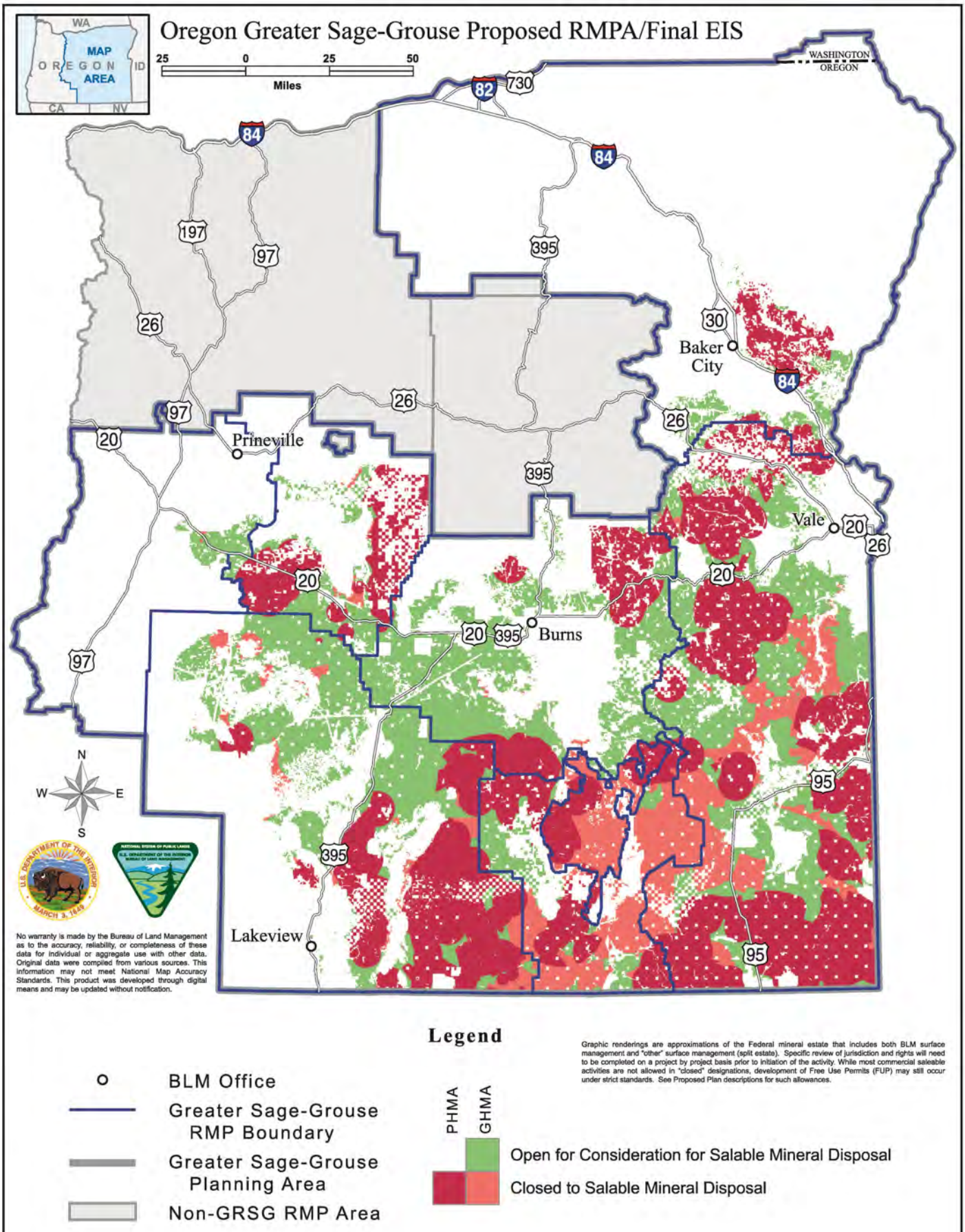

Figure 2-38: Salable Minerals in the Planning Area Alternatives B, D, and F

M14-06-03

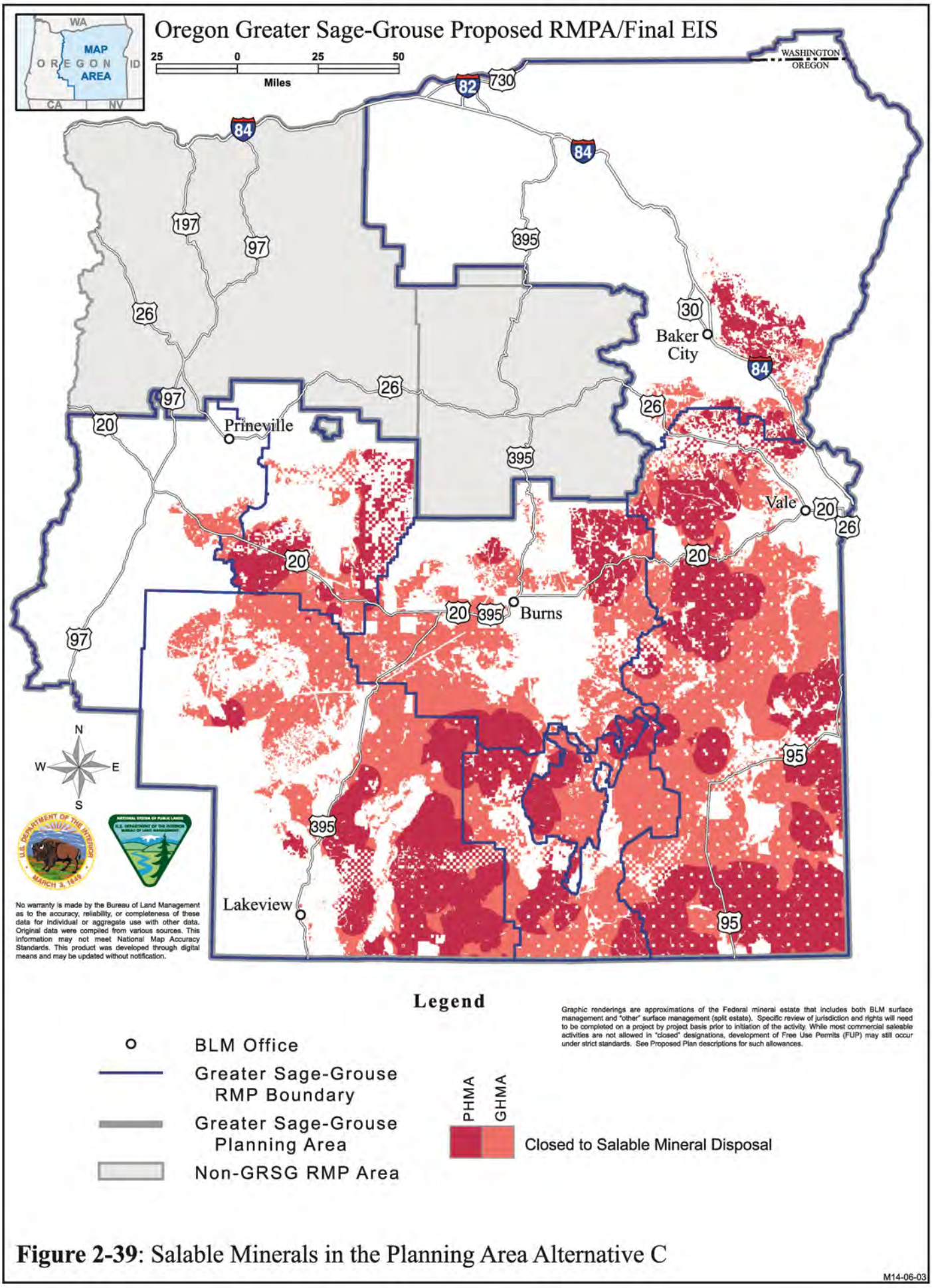

Figure 2-39: Salable Minerals in the Planning Area Alternative C

M14-06-03

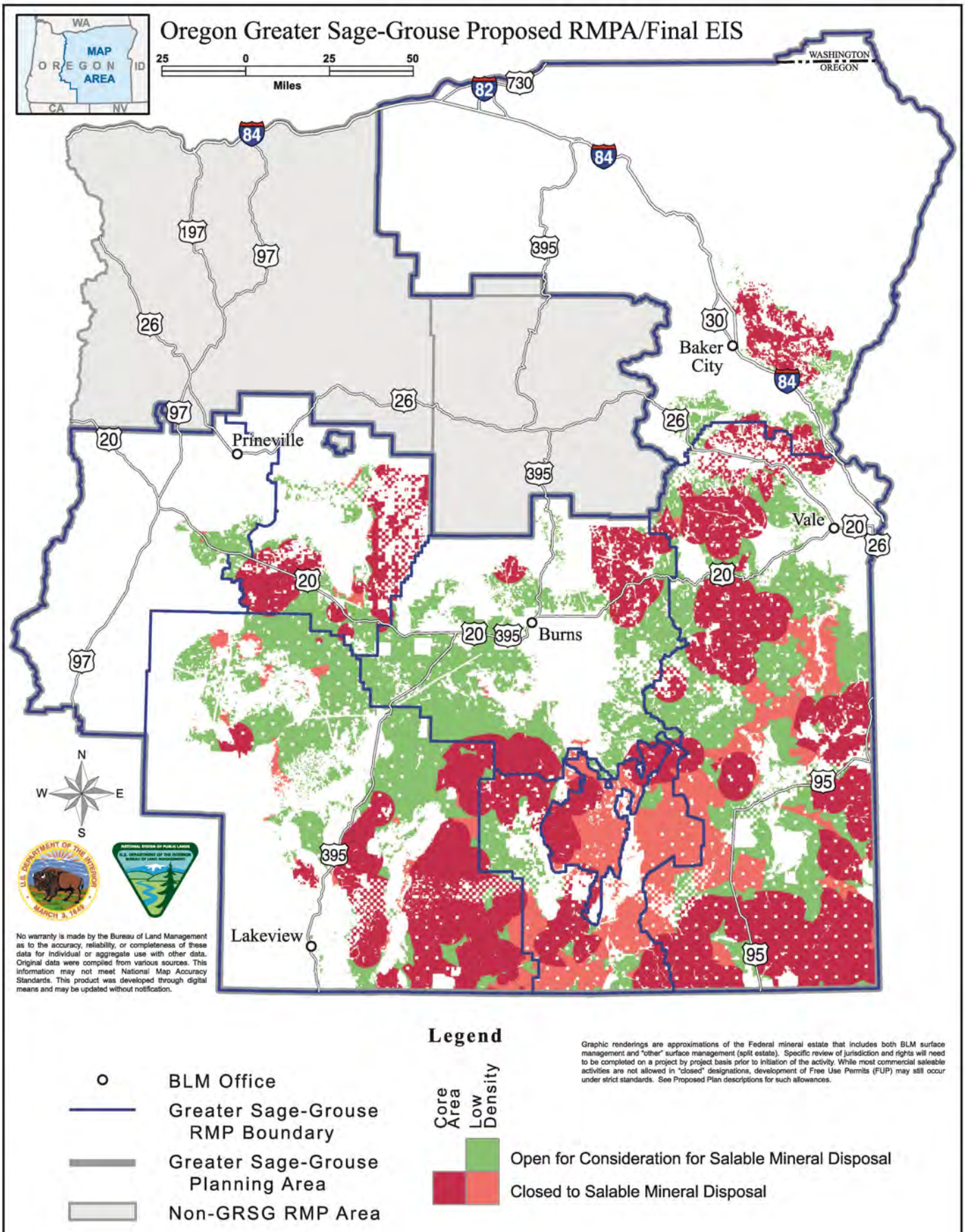

Figure 2-40: Salable Minerals in the Planning Area Alternative E

M14-06-03

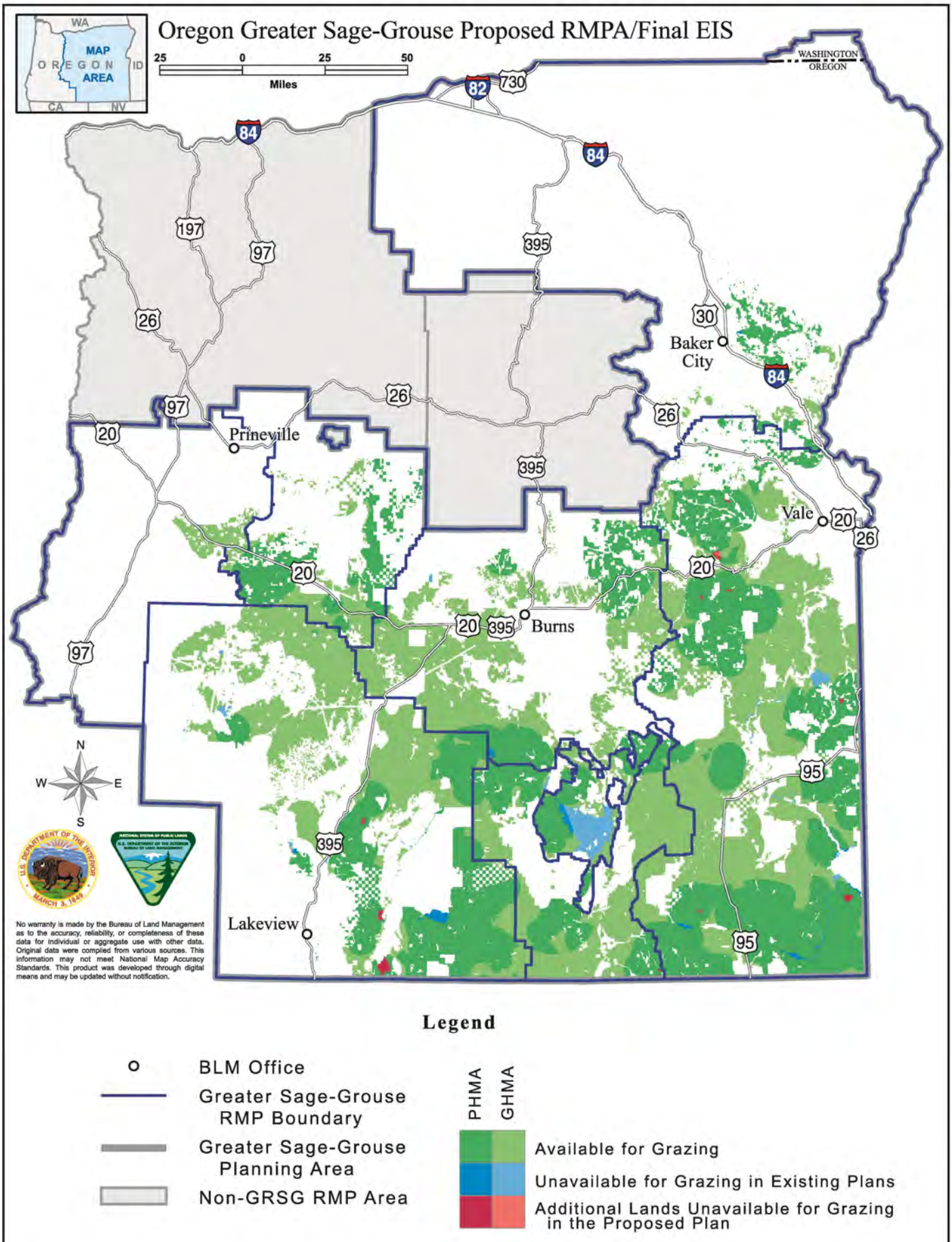

Figure 2-41: Livestock Grazing in the Planning Area Proposed Plan

M14-06-03

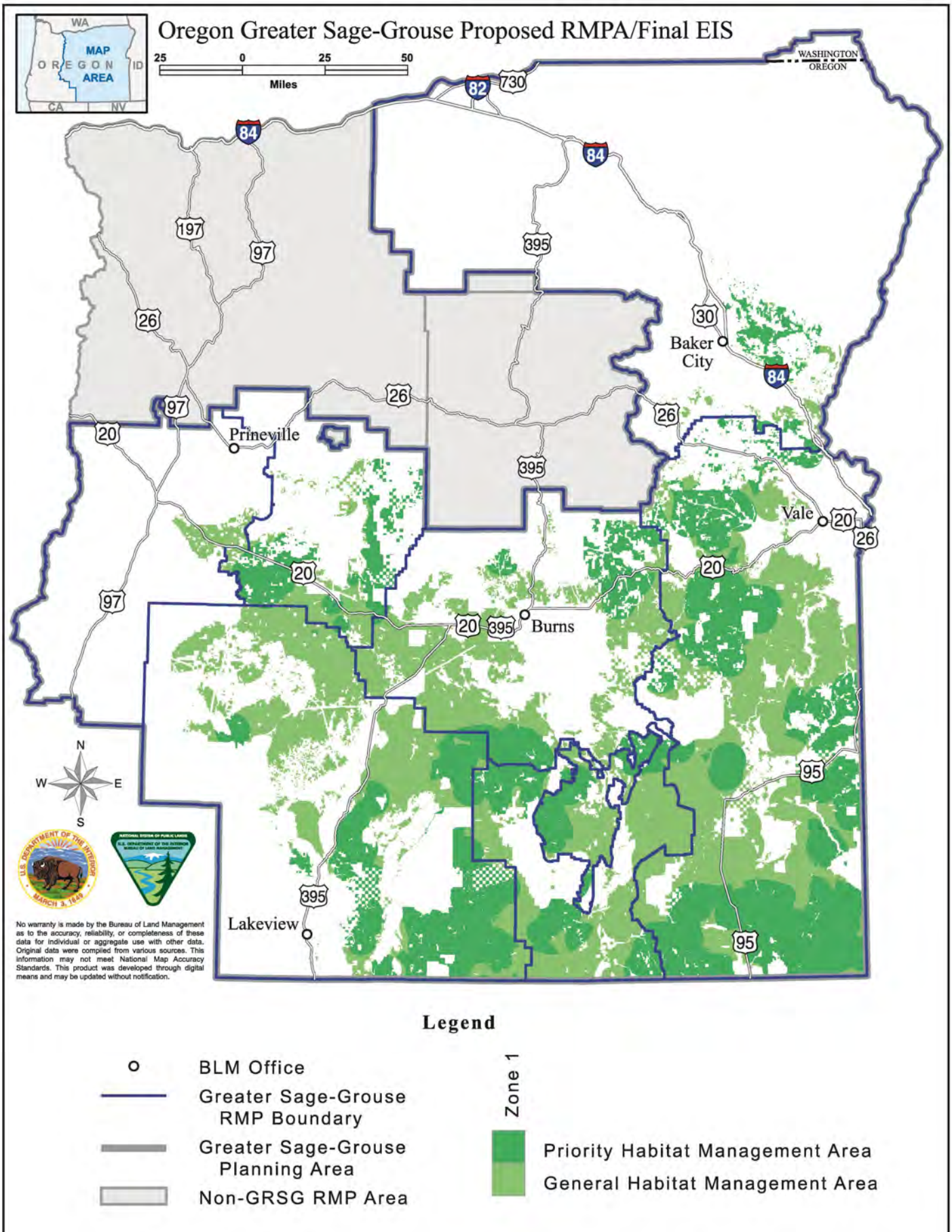

Figure 2-42: Land Tenure Zones in the Planning Area Proposed Plan

M14-06-03

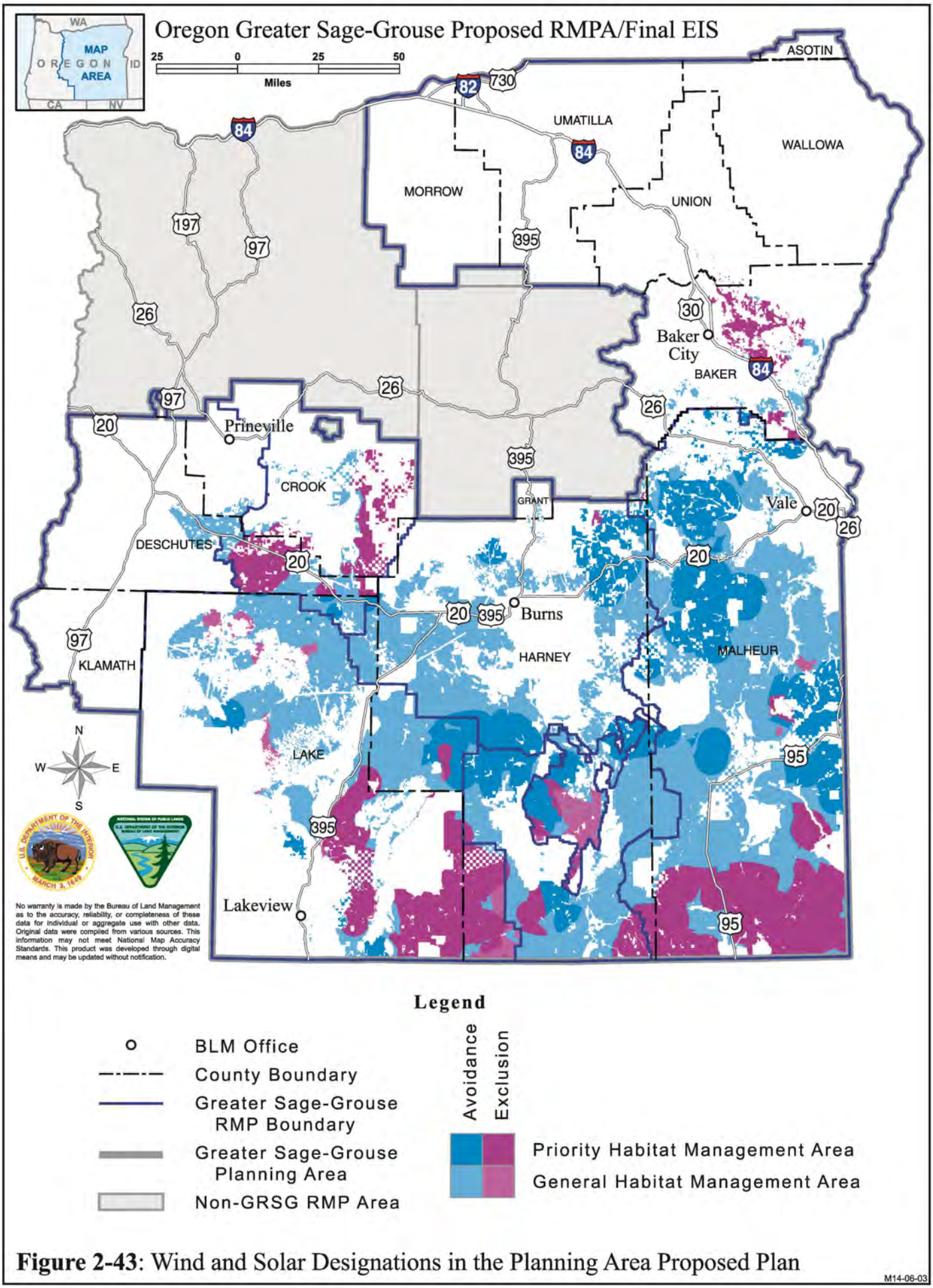

Figure 2-43: Wind and Solar Designations in the Planning Area Proposed Plan

M14-06-03

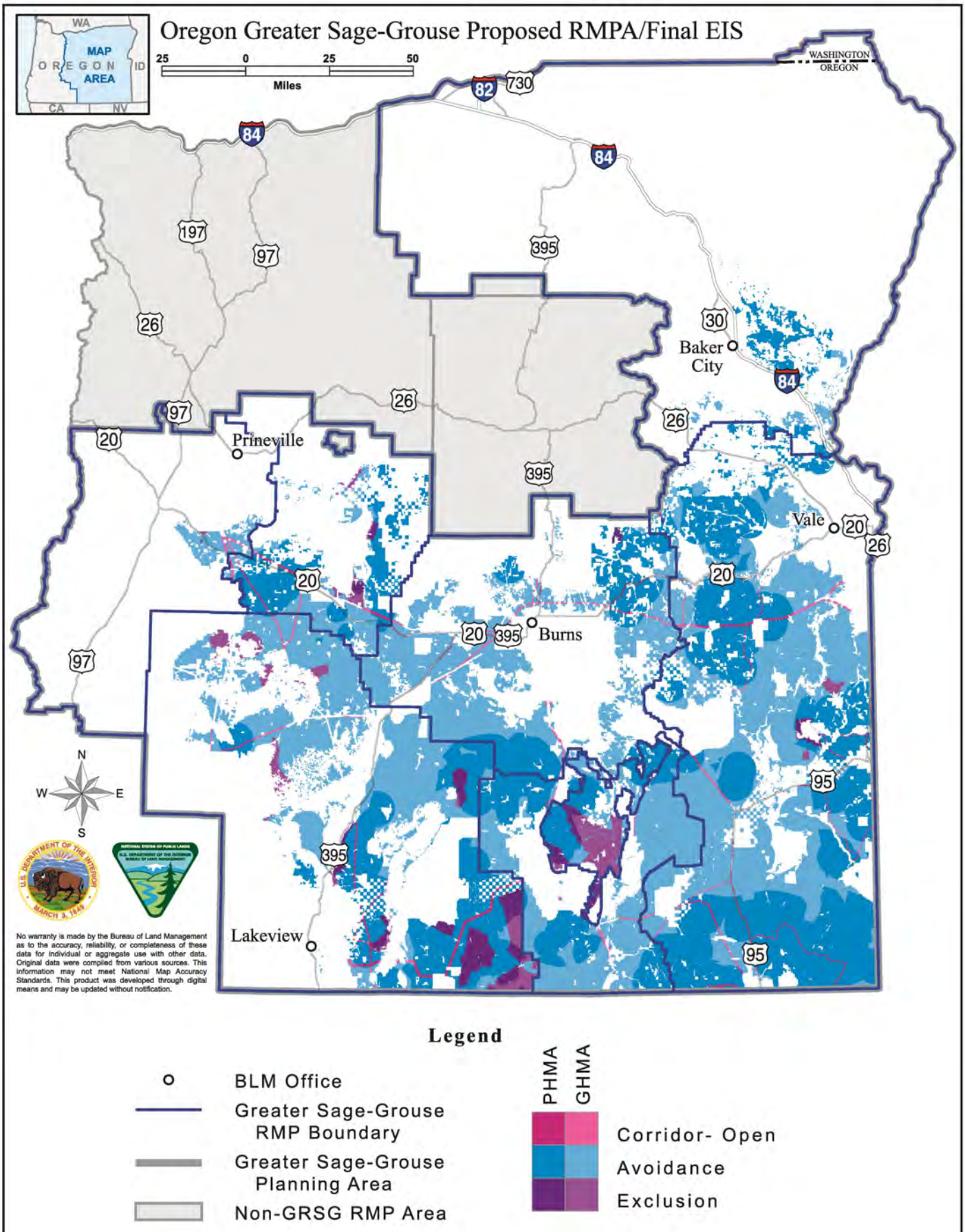

Figure 2-44: Major Right-of-Way Designations in the Planning Area Proposed Plan

M14-06-03

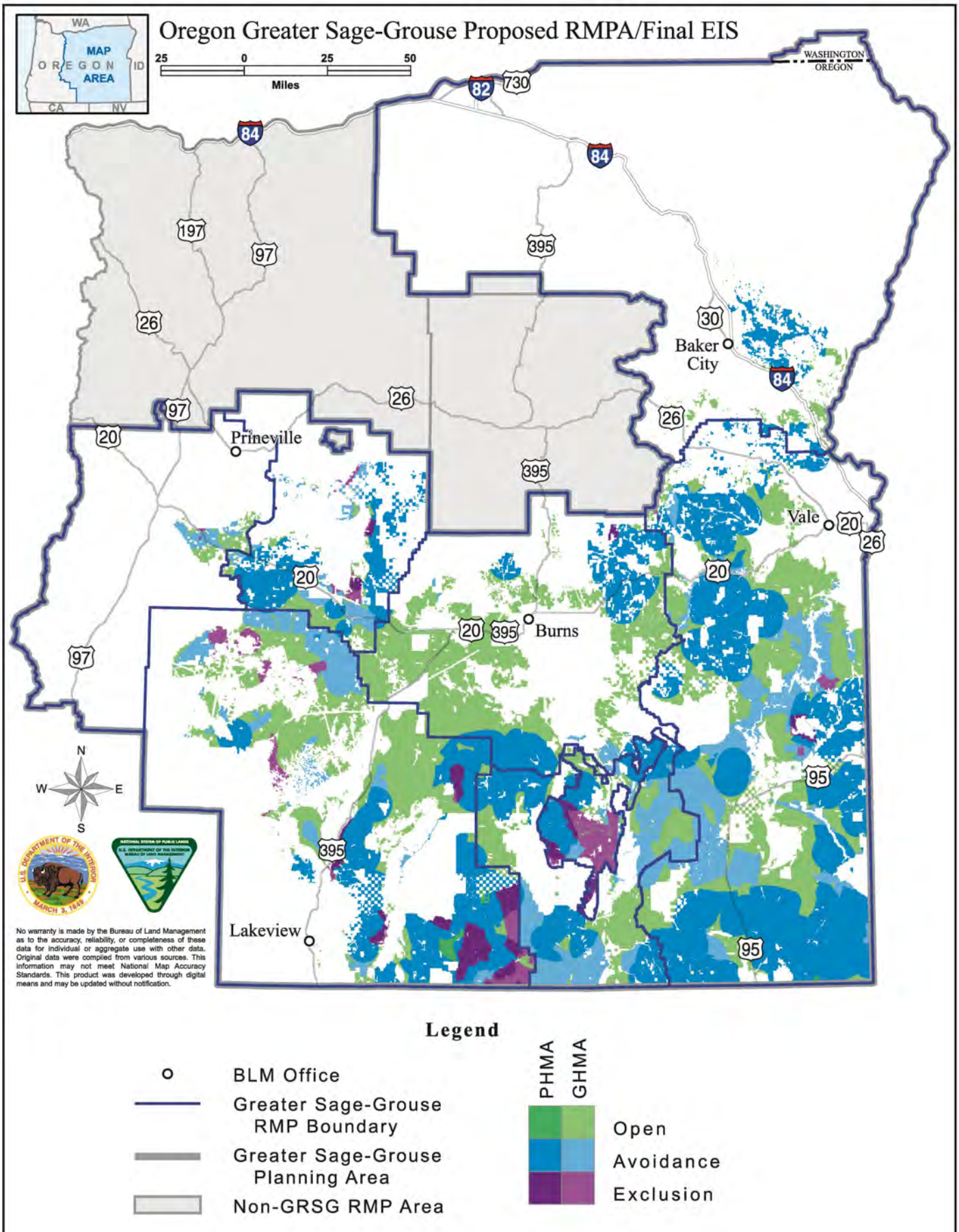

Figure 2-45: Minor Right-of-Way Designations in the Planning Area Proposed Plan

M14-06-03

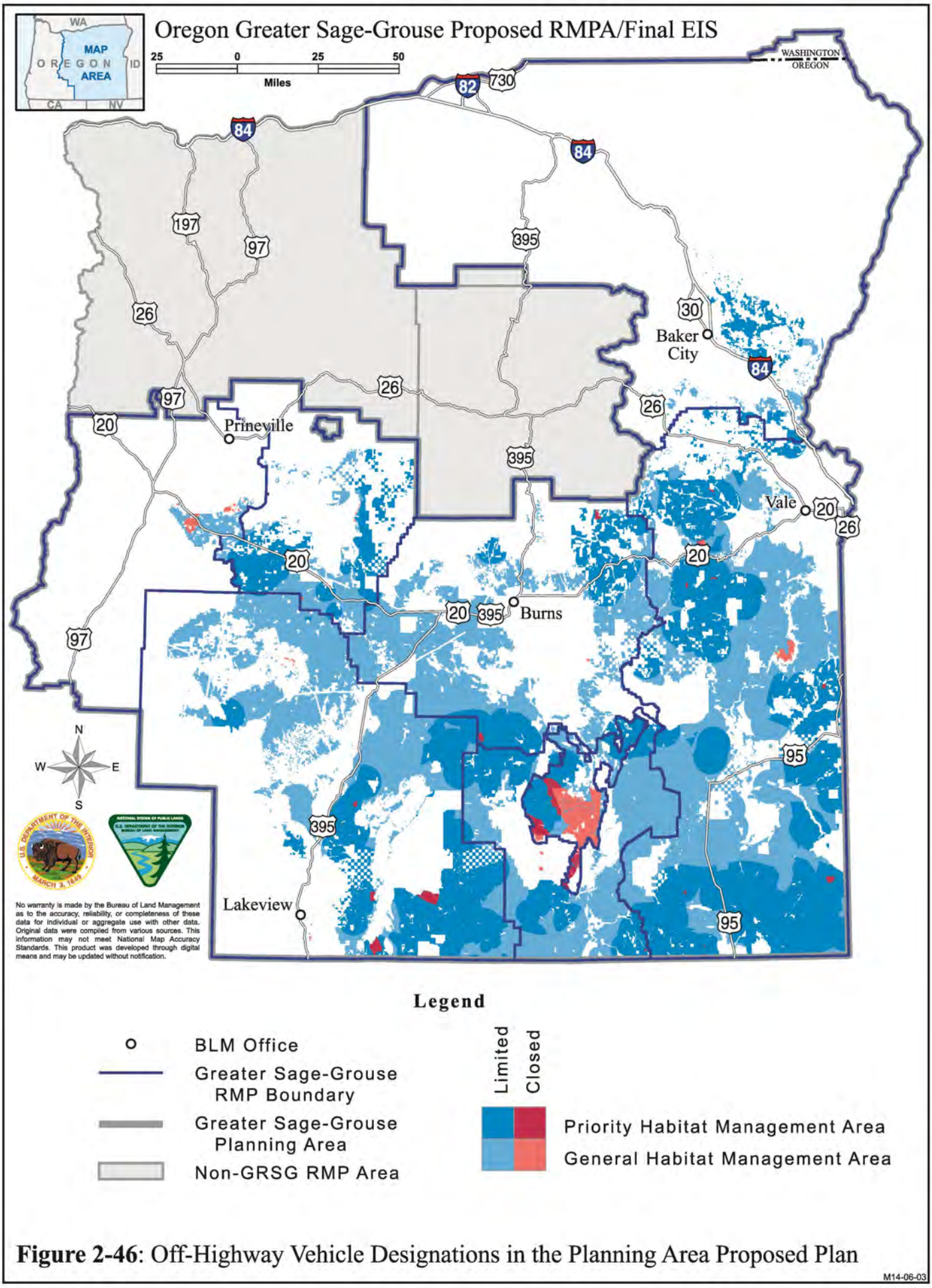

Figure 2-46: Off-Highway Vehicle Designations in the Planning Area Proposed Plan

M14-06-03

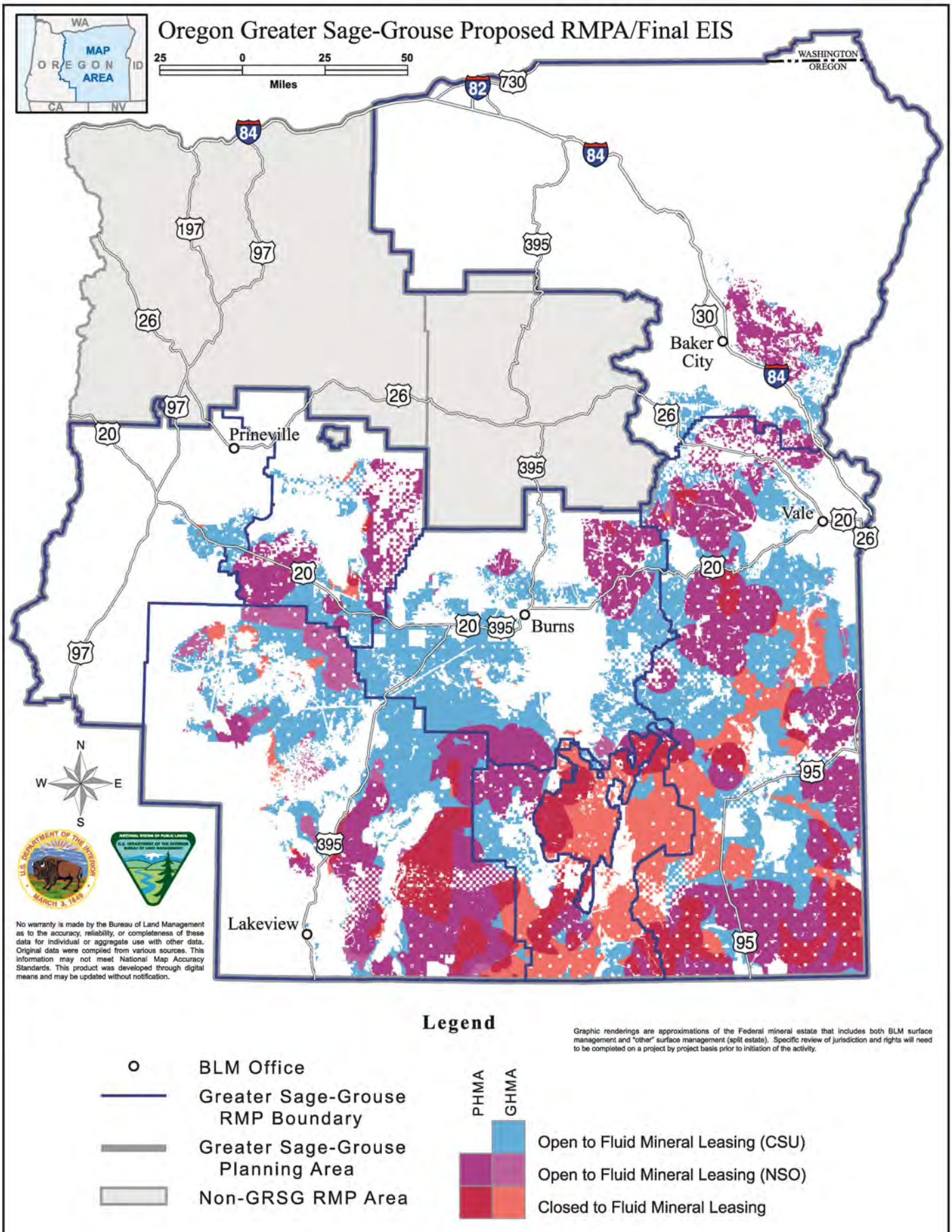

Figure 2-47: Leasable Fluid Minerals (Includes Geothermal) in the Planning Area Proposed Plan

M14-06-03

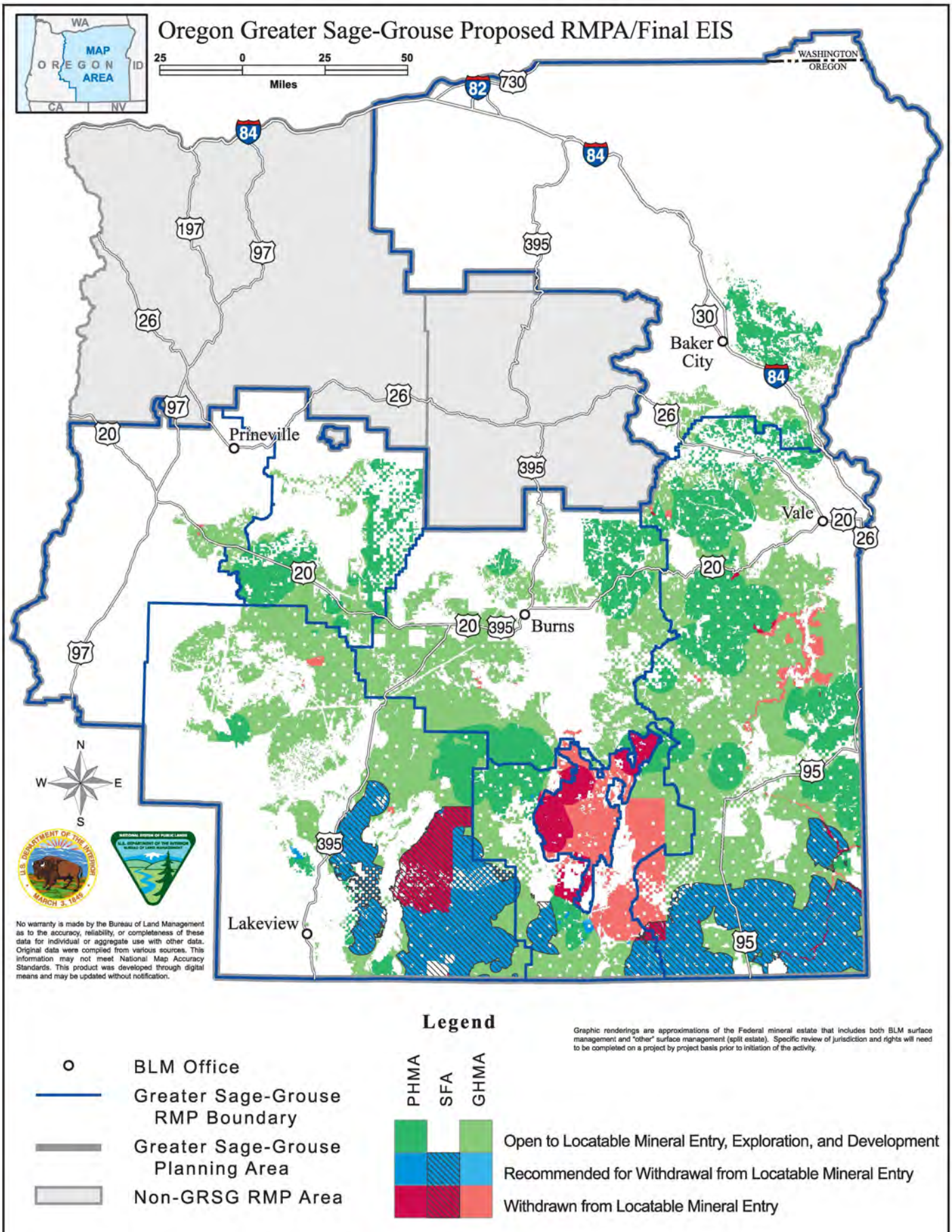

Figure 2-48: Locatable Minerals in the Planning Area Proposed Plan

M14-06-03

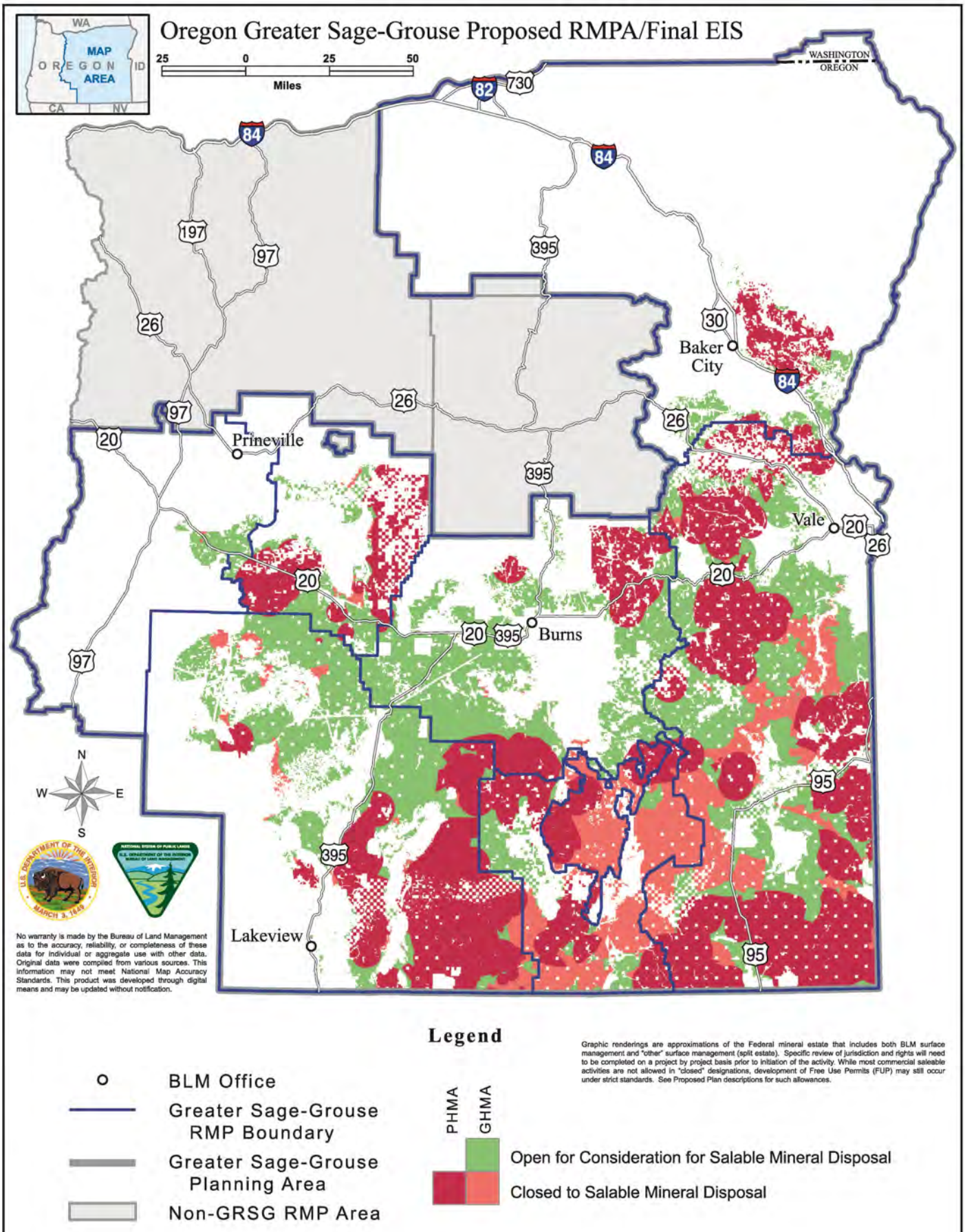

Figure 2-49: Salable Minerals in the Planning Area Proposed Plan

M14-06-03

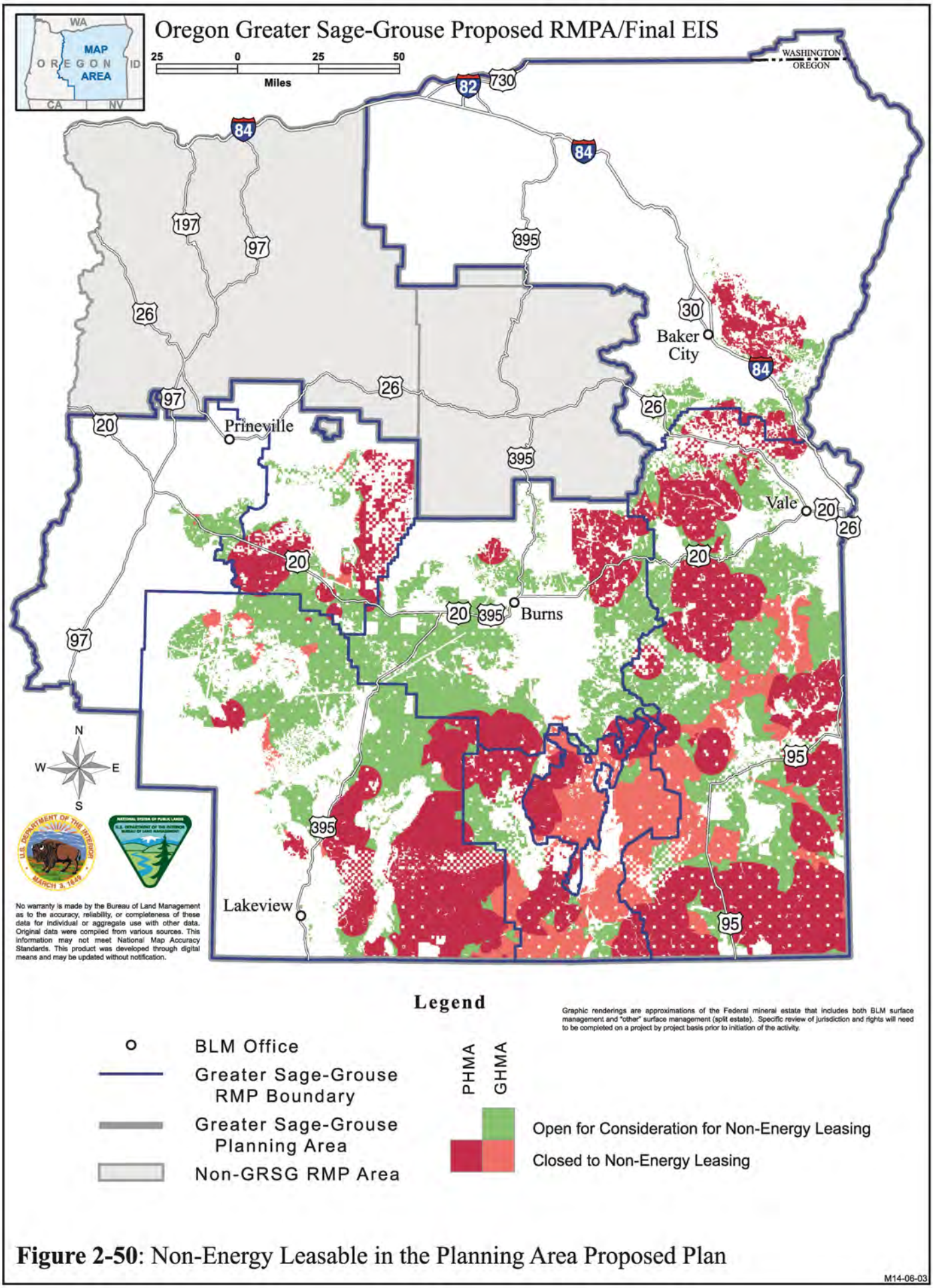

Figure 2-50: Non-Energy Leasable in the Planning Area Proposed Plan

M14-06-03

Appendix B

Greater Sage-Grouse Management in Existing Resource Management Plans

APPENDIX B
GREATER SAGE-GROUSE MANAGEMENT IN EXISTING RESOURCE MANAGEMENT PLANS

Resource programs in the Oregon Sub-region Resource Management Plans (RMPs) being amended by this RMP Amendment (RMPA)/Environmental Impact Statement (EIS) contain management that influences Greater Sage-Grouse and their habitat. The management is not common to all Oregon Sub-region RMPs, but rather specific to certain RMPs. Resource programs that involve RMP-specific management include land use planning elements that may be, for example, localized to a particular area or involve prominent issues. It is important to note that the prominence of an issue can change over time. As a result, older RMPs may have minimal resource program management for issues that have recently become of greater concern.

BLM RMPs contain a set of decisions that establish management goals, objectives, and direction for land within an administrative area, as prescribed under the planning provisions of the Federal Land Policy and Management Act (FLPMA). The management direction is designed to achieve RMP objectives, which identify specific desired outcomes for resources. It includes management measures that will guide day-to-day and future activities. It also includes project design features, stipulations, best management practices, standard operating procedures, guidelines, required processes and prescriptions, and administrative designations (such as Areas of Critical Environmental Concern [ACECs] or proposed withdrawals). Oregon Sub-region RMPs contain directions that purposefully manage Greater Sage-Grouse and their habitat. The management direction is identified in the following table under the BLM resource programs.

Plan	GRSG Topic	Description of Management	Page
AMU	General Habitat	The Bureau of Land Management (BLM) program documents or interagency plan/NEPA documents and decisions applicable to the Andrews Management Unit (AMU) (and Cooperative Management and Protection Area) include the following: Greater Sage-Grouse and Sagebrush-Steppe Ecosystems Management Guidelines (DOI et al. 2000b).	9
AMU	General Habitat	Actions to diversify structure and composition of selected nonnative seedings will be implemented when consistent with other resource objectives.	30
AMU	General Habitat	In managing uplands, the BLM needs to consider the consequences and relationships of management to life history needs of wildlife. The Executive Order on the Responsibilities of Federal Agencies to protect Migratory Birds, the Greater Sage-Grouse and Sagebrush-Steppe Ecosystem Management Guidelines, the BLM National (or Oregon/Washington state level) Sage-Grouse Habitat Conservation Strategy, and the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (when approved), give direction to protect or restore habitat for these species, many of which are Special Status Species.	35
AMU	General Habitat	Areas used by Greater Sage-Grouse and other Special Status Species will be identified in efforts orchestrated with the Oregon Department of Fish and Wildlife (ODFW) or the United States Fish and Wildlife Service (USFWS). Habitat management will be coordinated across agency boundaries.	37
AMU	General Habitat	Unless specifically needed as a vegetation management tool, the utilization level as measured at the end of the growing season will not exceed 60 percent on nonnative seedings and 50 percent on native herbaceous forage plants, on a pasture average basis, except where lower use levels may be necessary to prevent detrimental effects on habitat quality for sage-grouse.	54
AMU	General Habitat	Increase species and structural diversity at the plant community and landscape levels in the big sagebrush communities. Provide multiple successional stages within the landscape.	30
AMU	General Habitat	Manage big sagebrush, quaking aspen, and western juniper plant communities to meet habitat requirements for wildlife.	30
AMU	General Habitat	Manage big sagebrush communities to meet the life history requirements of sagebrush-dependent species.	30
AMU	General Habitat	Big sagebrush, quaking aspen, and western juniper plant communities will be managed for the benefit of all wildlife and to meet the DRC in most habitats throughout the AMU.	31
AMU	General Habitat	Throughout the AMU, approximately 5,000 acres of nonnative seedings and most native vegetation in deer winter range, where vegetative species diversity is low, will be interseeded to establish native plant species. Where appropriate, other desirable nonnative plant species could be used. Livestock grazing may be used to suppress competition and allow sagebrush establishment. In areas to be reseeded, coordination with permittees, the ODFW, and the USFWS will occur to set livestock grazing prescriptions on a site-specific basis.	34
AMU	General Habitat; Habitat Fragmentation	Big sagebrush habitat will be managed for shrub cover, structure, and forage values for the benefit of game and nongame wildlife. The DRC will include shrub cover values that meet or exceed the requirements described in Wildlife Habitats in Managed Rangelands (1984) and include big sagebrush distribution over a large enough area to avoid the adverse impacts of habitat fragmentation. The DRC will strive for big sagebrush overstories that emphasize the presence of mature, light- to moderately-stocked shrub canopies capable of supporting diverse herbaceous understories and are present in a variety of spatial arrangements important to wildlife. This will apply to most native range or seeded areas in big sagebrush habitats throughout the AMU.	31
AMU	General Habitat; Sagebrush Removal	(Restoration Seed Types and Mixes): In Greater Sage-Grouse habitat or deer winter range or both, interseeding, preferably using locally obtained seed, to establish native plant species onto approximately 5,000 acres of nonnative seedings throughout the AMU will be utilized where vegetative species diversity is low. The term "low species diversity" means conditions in seeded areas that are predominantly crested wheatgrass, or that have reverted to cheatgrass dominance, or few herbaceous plants with an overstory of sagebrush. Other desirable nonnative species could be used in	30

Plan	GRSG Topic	Description of Management	Page
		the seeding mix. Livestock grazing could be used to suppress competition and allow sagebrush establishment. In areas to be reseeded, coordination with permittees, the ODFW, and the USFWS will occur to set livestock grazing prescriptions on a site-specific basis. Emphasis of this project includes establishment of seedings on the north and west sides of Cooperative Management and Protection Area (CMPA). Brushbeating of sagebrush in a mosaic pattern may be allowed on 50 percent of seeded areas where brush cover is high.	
AMU	General Habitat	Big sagebrush habitat will be managed for the benefit of Special Status Species and to meet the DRC in most big sagebrush habitats throughout the AMU. Big sagebrush habitat will be managed in accordance with the Migratory Bird Executive Order, the Greater Sage-Grouse and Sagebrush-Steppe Ecosystem Management Guidelines, the BLM National (or OR/WA State level) Sage-Grouse Habitat Conservation Strategy and the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon when approved.	37
Baker	General Habitat	Habitat Management Plans (HMPs) will be developed for economically important wildlife species, including mule deer, antelope, bighorn sheep, and grouse. Primary emphasis of many of the plans will be ensuring the availability of palatable shrubs and cover for deer on crucial winter ranges in Baker County. Benefits will also accrue for many nongame species as a result of these habitat enhancement projects.	18
Baker	General Habitat	Improve upland habitat conditions for sage-grouse, antelope, and mule deer.	82
Baker	General Habitat	Improve and maintain, where suitable, wet meadows for sage-grouse and antelope.	82
Brothers-Lapine	General Habitat	HMPs will be written for high priority wildlife habitats, These plans will detail how those habitats will be improved or maintained. Plans for bald eagles are expected to be written during this planning cycle.	97
Lakeview	General Habitat	Upland native shrub steppe communities will be managed to attain a trend toward the desired range of conditions based on management objectives and site potential. Management actions will maintain the condition of those native communities where vegetation composition and structure meet desired range of conditions.	28
Lakeview	General Habitat	Equal emphasis will be placed on game and nongame wildlife habitat needs in sagebrush steppe, forest, woodland, and other priority habitats. To the extent possible and practical, wildlife community connectivity and interrelationships will be emphasized in most habitats. This approach will stress landscape or ecosystem management and be distinctly different from single-species management emphasis.	50
Lakeview	General Habitat/ Habitat Fragmentation	Big sagebrush habitat will be managed for shrub cover, structure, and forage values for the benefit of game and nongame wildlife. The desired range of conditions will include shrub cover values that meet or exceed the requirements described in "Wildlife Habitats in Managed Rangelands" (Thomas and Maser 1986) and provide big sagebrush distribution over a large enough area to avoid the adverse impacts of habitat fragmentation. Will strive to provide big sagebrush overstories that emphasize the presence of mature, light-to moderately stocked shrub canopies, and that are present in a variety of spatial arrangements important to wildlife.	unknown
Lakeview	General Habitat	Management of wildfire, prescribed fire, livestock grazing, wild horses, western juniper, invasive vegetation, vegetation treatments, land tenure, recreation, predators, and West Nile virus within current greater sage-grouse habitat will follow the guidelines outlined in the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat"* (ODFW 2005, p. 70-87), to the extent it conforms with other management direction in this RMP. However, the energy and minerals and right-of-way management direction described elsewhere in this RMP will be retained and applied to sage-grouse breeding habitat only (refer to Lands and Realty section, p. 93-94 and Map L-8 and the Energy and Minerals section, p. 88-92 and Maps M-8, M-9, and M-10).	5 as maintained
Lakeview	General Habitat	Management will emphasize achieving desired range of conditions that maintain, enhance, or restore habitats or populations of special status species regardless of their economic status. All special status species habitats or populations will be managed so that BLM actions will not contribute toward the need to list the species as Federally threatened or endangered.	52

Plan	GRSG Topic	Description of Management	Page
Lakeview	Habitat Fragmentation	Management of large blocks of sagebrush steppe will also be done with migratory landbirds in mind. Management will focus on existing shrub steppe in high ecological condition on a no-net-loss basis and improve degraded habitats. Habitat fragmentation will be reduced through active restoration of degraded rangelands and changes in management activities.	50
Southeastern Oregon	General Habitat Objective	Manage big sagebrush cover in seedings and on native rangeland to meet the life history requirements of sagebrush-dependent wildlife.	40
Southeastern Oregon	General Habitat	Objective 2: Manage big sagebrush cover in seedings and on native rangeland to meet the life history requirements of sagebrush-dependent wildlife. Management will strive for greater than 70 percent or more of the total potential sagebrush habitat to achieve desired range future conditions (DRFCs) in each resource area over the long term. Native range and most seedings will be managed to meet the requirements of game and a host of nongame species. Management will be to maintain or establish diversity, mosaics, and connectivity of sagebrush between geographic areas at middle and fine scales. The obligation to provide sagebrush cover for its various wildlife habitat values will be met in most areas. The overall goal of this alternative is to emphasize plant and animal community health at landscape levels.	40
Southeastern Oregon	General Habitat; Habitat Fragmentation	Manage to maintain or establish connectivity of big sagebrush types between geographic management areas (GMAs) at mid and fine scales. To achieve desired wildlife habitat conditions, management will include a variety of methods to maintain, increase, or decrease the big sagebrush overstory.	51
Southeastern Oregon	Wildlife and wildlife habitats	To the extent possible and practical, wildlife community connectivity and interrelationships will be emphasized in most habitats. Management emphasis will substantially address source habitats and species of focus described in the Interior Columbia Basin Ecosystem Management Plan (ICEBMP) science.	51
Southeastern Oregon	Appendix F-Wildlife Habitat Descriptions and Considerations	Summary of Appendix F (Introduction): Chapter 3 describes the DRFCs for land, resource, and social and economic conditions that are expected to be present on public land in 50 to 100 years if the plan management objectives are achieved. Because the DRFCs are descriptions associated with long-term BLM management, they provide limited direction for wildlife habitat assessments and prescriptions over the next 20 years. Due to this limitation, Appendix F has been included here to provide more descriptions of habitat characteristics important to wildlife that will be incorporated into activity plans and evaluated in both the short and the long term.	F-1
Southeastern Oregon	ACECs	A significant number of ACECs have sage-grouse specifically, or sagebrush habitat that is fundamental to sage-grouse life cycle needs as Relevant and Important values. Each of these has management actions targeted at conserving/protecting the species and/or its habitat.	68-101
Southeastern Oregon	Habitat Restoration	Guidance contained in 43 CFR 4180 of the regulations directs public land management toward the maintenance or restoration of the physical function and biological health of rangeland ecosystems. Standards of Rangeland Health and Guidelines for Livestock Grazing Management (S&G's) for public land administered by the BLM in Oregon and Washington were approved by the Secretary of the Interior on August 12, 1997 (USDI-BLM 1997). This objective will maintain and improve the condition and trend in plant communities that provide wildlife habitat, recreation, forage, scientific, scenic, ecological, and water and soil conservation benefits for consumptive and nonconsumptive uses. The long-term goal of vegetation management across the landscape is to maintain or improve rangeland condition to DRFCs that meet management objectives, not specifically late-potential natural communities (PNCs) ecological status.	38

Plan	GRSG Topic	Description of Management	Page
Southeastern Oregon	Habitat Restoration	All special status species habitats or populations will be managed so that BLM actions will not contribute to the need to list the species as Federally threatened or endangered. Management will consist of a mix of protection, restoration, and enhancement actions. It will be oriented toward the development of habitats that support healthy, biologically diverse plant communities at landscape levels while meeting the needs of special status species. A variety of projects or other land use adjustments might be required to manage for special status species. Management could require avoidance or mitigation that may have little impact on land uses, while restoration or enhancement could lead to substantial adjustments in customary land use. Management will emphasize achieving conditions that maintain, enhance, or restore habitats and populations regardless of their economic status. All special status species habitats or populations will be substantially managed so that BLM actions do not contribute toward the need to list these species as Federally threatened or endangered. Individual species requirements will be included in management prescriptions but not to an extent that overemphasizes the value of any one habitat. Restoration and management of sagebrush communities that are important for sagebrush obligate wildlife species, including sage-grouse are described in detail in the Southeast Oregon RMP (SEORMP) Appendix F-5.	Appendix F-5
Southeastern Oregon	Habitat Restoration	Wildlife diversity and productivity is profoundly influenced by the relative abundance, structure, and spatial arrangement of sagebrush communities (refer to Chapter 2, Wildlife and Wildlife Habitat, Figure 2-1 Preliminary SEORMP/Final EIS). Management of sagebrush communities that is appropriate to soil, climate, and landform needs to incorporate the following overstory and understory components, which contribute towards healthy wildlife habitats: Shrub overstory: Big sagebrush, low sagebrush, and other shrubby species within the genus Artemisia provide primary sources of wildlife habitat structure, food, and cover. Herbaceous understory: Grasses and forbs provide primary sources of wildlife habitat structure, food and cover. Herbaceous cover also provides indirect food sources for wildlife by supporting the environments that produce insects consumed by birds and other small animals.	Figure 2-1 Preliminary SEORMP/ Final EIS
Southeastern Oregon	Habitat Restoration	Exceeding the fine scale (pasture level) percents (acreages) for shrub cover values shown in Table F-2 may be necessary in order to compensate for currently fragmented habitats and/or where it is likely that fragmentation will continue due to fire history and frequency. Determining activity plan objectives can only be made after considering existing cover conditions at mid scales and larger, and in light of wildlife survey or habitat relationships data. This will be accomplished as a part of the rangeland health assessment process.	F-5
Southeastern Oregon	Habitat Restoration	Avoidance or mitigation of disturbing activities can usually be accomplished by prescribing adjustments to the timing, location, or duration of authorized actions. In some instances, project denial may be the only appropriate course of action where resource values are high and mitigation or avoidance cannot reasonably be made. The appropriate measures necessary for the protection of wildlife need to consider the nature of proposed actions, the species affected, and the time of year the action is expected to occur.	F-2
Southeastern Oregon	Habitat Restoration	Seedings will be implemented with appropriate mixes of adapted perennial species. Species mixes will be determined on a site-specific basis dependent on the probability of successful establishment, risks associated with seeding failure, and other management considerations. Preference will be toward the use of native species, though nonnative species may be used when better adapted to out-compete established annual species. Use of competitive native species or desirable nonnative species will be emphasized in seedings within sites moderately and highly susceptible to degradation. Treatment configuration will emphasize the maintenance of natural values as consistent with other resource management objectives.	40

Plan	GRSG Topic	Description of Management	Page
Southeastern Oregon	Habitat Restoration	Management will be to maintain or establish diversity, mosaics, and connectivity of sagebrush between geographic areas at middle and fine scales. The obligation to provide sagebrush cover for its various wildlife habitat values will be met in most areas. The overall goal of this alternative is to emphasize plant and animal community health at landscape levels. To achieve DRFCs, management will include a variety of methods to increase or decrease big sagebrush overstory. Quantifications of shrub occurrence are described in Appendix F.	40-41
Southeastern Oregon	Habitat Restoration	Over the life of this plan, vegetation communities will be monitored to determine progress toward attaining DRFCs. Monitoring to determine success in meeting vegetation management objectives will include periodic measurements of plant composition, vigor, and productivity as well as measurement of the amount and distribution of plant cover and litter which protects the soil surface from raindrop impact, detains overland flow, protects the surface from wind erosion, and retards soil moisture loss through evaporation.	40, Monitoring
Southeastern Oregon	Habitat Restoration	Seedings will be implemented with appropriate mixes of adapted perennial species. Species mixes will be determined on a site-specific basis dependent on the probability of successful establishment, risks associated with seeding failure, and other management considerations. Preference will be toward the use of native species, though nonnative species may be used when better adapted to out-compete established annual species. Use of competitive native species or desirable nonnative species will be emphasized in seedings within sites moderately and highly susceptible to degradation. Treatment configuration will emphasize the maintenance of natural values as consistent with other resource management objectives. Note that the SEORMP specifically requires appropriate accordance with Manuals 6340 and 6330 for seedings in WSAs.	40
Southeastern Oregon	Habitat Restoration	Control methods will include preventive management to maintain competitive vegetation cover and reduce the distribution and introduction of noxious weed seed; manual and mechanical methods to physically remove noxious weeds; biological methods to introduce and cultivate factors that naturally limit the spread of noxious weeds; cultural practices; and application of chemicals. Target species will include those identified by county, state, and BLM weed priority lists.	41
Southeastern Oregon	Habitat Restoration	Shrub cover capable of supporting the life history requirements of sage-grouse and other wildlife that use sagebrush habitats (such as Classes 3, 4, and 5 from Table F-1)should be present at multiple scales, over a large area, and in a variety of spatial arrangements (such as at a landscape level and with connectivity present). This should include a central core of sagebrush habitat which is present in large contiguous blocks as well as some other habitat arrangements such as islands, corridors, and mosaic patterns. Each of these patterns has significance to wildlife within geographic areas. Wildlife objectives for sagebrush communities in individual pastures, allotments, and GMAs will be determined on the basis of factors such as: (1) presence of sage-grouse and their seasonal life history needs, (2) existing native shrub cover patterns and characteristics within each GMA, (3) the frequency and reasonably foreseeable likelihood of fire, and (4) locations of seedings and their shrub overstory conditions. Shrub cover should be present that shows some mix of height and age classes but with an overall emphasis on the presence of communities with shrubs in a mature structural status per Thomas et al. (1984).	Appendix F-5 at p F-6
Southeastern Oregon	Habitat Restoration	Restore, protect, and enhance the diversity and distribution of desirable vegetation communities, including perennial native and desirable introduced plant species.	38
Southeastern Oregon	Habitat Restoration	Upland native rangeland communities will be managed to attain a trend toward DRFCs based on management objectives and site potential. Management actions will maintain the condition of those native communities where vegetation composition and structure will be consistent with desired conditions and natural values. Nonnative seedings in poor or fair condition will be managed to restore production and vigor, as well as to improve structural and species diversity consistent with other management objectives. Nonnative seedings in good or excellent condition will be managed to maintain seeding health, improve structural and species diversity, and ensure continued forage production. Upland shrub cover across the landscape will be maintained at moderate to heavy levels of potential for wildlife cover values (see	39

Plan	GRSG Topic	Description of Management	Page
		Appendix F, Table F-1) and structural diversity in most native vegetation communities where potential exists and in nonnative seedings as consistent with other resource management objectives.	
Southeastern Oregon	Habitat Restoration	Manage to maintain or establish connectivity of big sagebrush types between GMAs at mid and fine scales. To achieve desired wildlife habitat conditions, management will include a variety of methods to maintain, increase, or decrease the big sagebrush overstory. (p.52) The following from Appendix F-6: 1. Restore rangelands that are depleted in structure and plant composition due to past uses, fires, and weed invasions. Restoration with multiple native species is preferable to using introduced species such as crested wheatgrass. However, if native species cannot be established because (1) native seed sources are not available, or (2) intense competition from other undesirable vegetation is very likely to limit the success in establishing natives, then introduced grasses with a shrub component (crested wheatgrass and shrubs) will be considered preferable to taking no rehabilitation action at all. Fire and weed threats to remaining areas of good quality native range need to be reduced or eliminated where possible. 2. Reduce the level of western juniper encroachment into rangeland sites that threaten sage-grouse as a result of habitat loss and hunting perches for avian predators. Use mechanical means, rather than fire, where the risk of exacerbating fire cycles associated with invasive species (such as cheatgrass) is high. 3. Modify landscape character in monotypic stands of sagebrush where there is reason to believe that such action would enhance wildlife habitat values and not further exacerbate problems associated with fragmentation. 4. Restore habitat complexity, diversity, and structure in at least portions of rangelands currently dominated by monoculture stands of adapted grasses (nonnative). This action is considered appropriate if the area is judged to be of substantial consequence to the connectivity of individual geographic areas and the outcome would benefit critically important wildlife habitats (such as areas of concentrated or otherwise highly significant wildlife use). 5. Delay the timing of certain crested wheatgrass retreatments (treatments for the purpose of encouraging more grass production) where the status of sage grouse winter use and breeding activity is uncertain. Prescribe treatments based on documented field survey data that address sage grouse absence or presence.	Appendix F-6 at p F-10
Southeastern Oregon	Habitat Restoration	Use cultural practices to establish greenstrips in order to diminish the chances for further loss of quality sagebrush habitats to wildfire. This is especially true for quality sage grouse habitats that adjoin fire prone, cheatgrass-dominated areas.	
Southeastern Oregon	Habitat Restoration	The Preliminary SEORMP/Final EIS is based on adaptive management, which is a continuing process of planning, implementation, monitoring, and evaluation, to adjust management strategies to meet goals and objectives of ecosystem-based management. The concept of adaptive management uses the latest scientific information, site-specific information/data, and professional judgment to select the management strategy most likely to meet goals and objectives. The concept also acknowledges the need to manage resources under varying degrees of uncertainty as well as the need to adjust to new information. Through continually adjusting management strategies as needed, supported by monitoring or additional information, adaptive management will result in attainment of short- and long-term trend toward meeting objectives. Adaptive management provides the capability to respond quickly to monitoring data with consideration given to past season monitoring or preseason conditions.	111

Plan	GRSG Topic	Description of Management	Page
Southeastern Oregon	Habitat Restoration	Management actions will be implemented to rehabilitate and/or vegetate plant communities that do not meet DRFCs due to dominance by annual, weedy, or woody species. Vegetation manipulation projects will be implemented primarily to direct trend toward desired conditions, improve structural and species diversity, and protect soil, water, and vegetation resources. Emphasis will be placed on the use of prescribed and wildland fire to regulate woody species dominance and direct vegetation composition toward desired conditions.	39
Steens	General Habitat	The BLM program documents and interagency plan/NEPA documents and decisions applicable to the CMPA (and AMU) include the following: Greater Sage-Grouse and Sagebrush-Steppe Ecosystems Management Guidelines (USDI et al. 2000b)	9
Steens	General Habitat	Actions to diversify structure and composition of selected nonnative seedings will be implemented consistent with other resource objectives. In Greater sage-grouse habitat or deer winter range or both, interseeding, preferably using locally obtained seed, to establish native plant species onto approximately 5,000 acres of nonnative seedings throughout the CMPA, will be utilized where vegetative species diversity is low. Low species diversity areas are those that are predominantly crested wheatgrass, or have reverted to cheatgrass dominance, or have few herbaceous plants with an overstory of sagebrush. Other desirable nonnative species may be used in the seeding mix. Livestock grazing may be used to suppress competition and allow sagebrush establishment. In areas to be reseeded, coordination with permittees, the ODFW, and the USFWS will occur to set livestock grazing prescriptions on a site-specific basis. Emphasis of this project includes establishment of seedings on the north and west sides of Steens Mountain. Brushbeating of sagebrush in a mosaic pattern may be allowed on 50 percent of seeded areas where brush cover is high.	30
Steens	General Habitat	In managing uplands, the BLM needs to consider the consequences and relationships of management to life history needs to wildlife. The Executive Order on the Responsibilities of Federal Agencies to protect Migratory Birds, the Greater Sage-Grouse and Sagebrush-Steppe Ecosystem Management Guidelines, the BLM National (or OR/WA State level) Sage-Grouse Habitat Conservation Strategy, and the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (when approved) give direction to protect or restore habitat for these species, many of which are Special Status Species.	36
Steens	General Habitat	Areas used by Greater Sage-Grouse and other Special Status Species will be identified in efforts orchestrated with the ODFW or USFWS. Habitat management will be coordinated across agency boundaries.	38
Steens	General Habitat	Big sagebrush habitat will be managed for benefit of Special Status Species and to meet DRC in most big sagebrush habitats throughout the CMPA. Big sagebrush habitat will be managed in accordance with the Migratory Bird Executive Order, Greater Sage-Grouse and Sagebrush-Steppe Ecosystem Management Guidelines, BLM National (or Oregon/Washington state level) Sage-Grouse Habitat Conservation Strategy and Greater Sage-Grouse Conservation Assessment and Strategy for Oregon when approved.	38
Steens	General Habitat	Unless specifically needed as a vegetation management tool, utilization levels as measured at the end of the growing season will not exceed 60 percent on nonnative seedings and 50 percent on native herbaceous forage plants, on a pasture average basis, except where lower use levels may be necessary to prevent detrimental effects on habitat quality for sage-grouse.	53
Steens	General Habitat	Increase species and structural diversity at the plant community and landscape levels in the big sagebrush communities. Provide multiple successional stages within the landscape.	30
Steens	General Habitat	Manage big sagebrush, quaking aspen, and western juniper plant communities to meet habitat requirements for wildlife.	31
Steens	General Habitat	Manage big sagebrush communities to meet the life history requirements of sagebrush-dependent species.	31
Steens	General Habitat	Big sagebrush, quaking aspen, and western juniper plant communities will be managed for the benefit of all wildlife and to meet the desired range condition (DRC) in most habitats throughout the CMPA.	31

Plan	GRSG Topic	Description of Management	Page
Steens	General Habitat	Throughout the CMPA, approximately 5,000 acres of nonnative seedings and most native vegetation in deer winter range, where vegetative species diversity is low, will be interseeded to establish native plant species. Where appropriate, other desirable nonnative plant species may be used. Livestock grazing may be used to suppress competition and allow sagebrush establishment. In areas to be reseeded, coordination with permittees, the ODFW, and the USFWS will occur to set livestock grazing prescriptions on a site-specific basis.	34
Steens	General Habitat; Habitat Fragmentation	Big sagebrush habitat will be managed for shrub cover, structure, and forage values for the benefit of game and nongame wildlife. The DRC will include shrub cover values that meet or exceed the requirements described in Wildlife Habitats in Managed Rangelands (1984) and include big sagebrush distribution over a large enough area to avoid the adverse impacts of habitat fragmentation. The DRC will strive for big sagebrush overstories that emphasize the presence of mature, light-to-moderately stocked shrub canopies capable of supporting diverse herbaceous understories and are present in a variety of spatial arrangements important to wildlife. This will apply to most native range or seed areas in big sagebrush habitats throughout the CMPA.	31
Three Rivers	Sagebrush Removal	Allow no big sagebrush removal within two miles of sage grouse strutting grounds when determined by a wildlife biologist to be detrimental to sage grouse habitat requirements.	2-75
Upper Deschutes	General Habitat	Vegetation treatments to maintain or restore shrub-steppe communities will be based on a landscape level restoration of broad vegetative types. Priorities for treatment will focus on areas that will show the biggest ecological gain for a given level of treatment intensity or investment. Cost-benefit t ratios will help determine project priority and scale. Priorities will include restoration of sage-grouse and other special status species habitat. Areas that have transitioned beyond the threshold of restoration success with reasonable treatment effort and expense will normally receive lower priority.	31
Upper Deschutes	General Habitat	In coordination with other federal and state natural resource management agencies develop a long-term conservation strategy for managing sage-grouse habitats.	46
Upper Deschutes	General Habitat	Maintain existing shrub-steppe habitats in the existing sage grouse range in order to sustain sage-grouse populations and protect options for the future (Information Bulletin No. OR-200-334).	48
Upper Deschutes	General Habitat	Consider partnering with ODFW, OMD, USFWS, and others in developing a multispecies habitat conservation strategy for the Bend/Redmond, Horse Ridge, Mayfield Pond, Millican Plateau, North Millican, and Prineville Reservoir geographic areas. Focal species for this strategy are to include, but not be limited to sage-grouse, deer, elk, pronghorn, and golden eagles.	54
Upper Deschutes	General Habitat	Vegetative habitat needs of sagebrush-steppe obligate species will be emphasized in treatment design.	31
Upper Deschutes	General Habitat; Habitat Fragmentation	Where ecologically appropriate, restore or maintain stands of large contiguous sagebrush communities in patches of 400 acres and larger. Design of landscape patterns will include connectivity of large shrub-steppe patches.	31
Vegetation			
Andrews Management Unit (Andrews)	Conifer Encroachment	Reduce the influence of western juniper trees less than 120 years old to restore riparian and sagebrush habitats. Western juniper trees less than 120 years old may be cut in riparian areas and sagebrush plant communities.	29
Lakeview	Conifer Encroachment	When evaluating areas for western juniper treatment (including areas for commercial and public wood cutting), priority areas will be those areas where the western juniper is most adversely affecting other resources. These include quaking aspen groves, riparian areas, and Greater Sage-Grouse leks.	34

Plan	GRSG Topic	Description of Management	Page
Steens Mountain Cooperative Management and Protection Area (Steens)	Conifer Encroachment	Reduce the influence of western juniper trees less than 120 years old to restore riparian and sagebrush habitats.	28
Southeastern Oregon	Forest and Woodlands	Western juniper management will be implemented to maintain commodity production, enhance resource values, and reduce western juniper dominance. Priority areas for western juniper treatments will be riparian/wetlands, quaking aspen stands, productive grasslands, forested areas, and shrublands where loss of vegetation diversity is likely. Treatments will be conducted to provide a mosaic pattern to meet wildlife habitat requirements. A maximum of 124,500 acres of western juniper will be treated during the life of the plan, using prescribed fire and/or mechanical treatment. Acres burned in wildfire situations will be included as part of acres treated (p. 43)	43
Southeastern Oregon	Conifer Encroachment	Habitats that support western juniper should provide the following kinds of characteristics important to wildlife: 3) Limited juniper presence in rangelands where sage-grouse forage and cover values are threatened or where predation by raptors may be affecting limited grouse populations. 6) Vegetation mosaics within project sites so that the result of treatments is approximately 50 percent juniper habitat and 50 percent shrub/grassland habitat. The patch size and layout of cover types resulting from projects (burning or cutting) is dependent upon wildlife that use the area and cover conditions within the geographic area being affected.	Appendix F-7, p. F11
Southeastern Oregon	Rangeland Vegetation	Upland shrub cover across the landscape will be maintained at moderate to heavy levels of potential for wildlife cover values (see Appendix F, Table F-1) and structural diversity in most native vegetation communities where possible and in nonnative seedings as consistent with other resource management objectives. The frequency, distribution, and ecological integrity of native stands of mountain shrubs will be restored and maintained where site potential will support these species. Appropriate Management Reponses (AMR) will be implemented on wildland fires to meet vegetation management and other objectives.	39
Livestock Grazing			
Southeastern Oregon	Objectives / Grazing in upland habitats	Grazing Considerations for Upland Habitats: Key grass forage species on native ranges should be grazed at stocking levels that allow for maintenance or improvement of plant vigor and recruitment of young plants. Native range should be grazed in such a way that a patchy appearance comprised of lightly to moderately grazed and ungrazed areas are prevalent throughout most of the pasture. The rangeland may be topped, skimmed, or grazed substantially in patches. In so doing, a combination of seasonally important habitat values important to wildlife will be present, including grazed (conditioned) forage plants and areas with high quality cover and structure (ungrazed or slightly grazed vegetation). Shrub overstories capable of supporting sage-grouse and other species that use sagebrush habitats should be present on at least 50 to 75 percent of the surface acreage of livestock management pastures capable of supporting big sagebrush communities. (p F-6)	Appendix F-3, F-4

Plan	GRSG Topic	Description of Management	Page
Southeastern Oregon	Grazing practices	Unless specified with rationale, the following factors will be considered consistent with the protection of most wildlife habitat values in activity plans. Key area selection for monitoring activity plan performance (effectiveness monitoring) is based on habitat type, land-form, and/or fence locations at reasonable distances from water accessible to livestock or wild horses. One or more key species of wildlife and wildlife seasons of use need to be identified for activity plan evaluation purposes. 1) Grazing systems should incorporate periodic yearlong rest and/or growing season deferment. 2) Key grass forage species on native ranges should be grazed at stocking levels that allow for maintenance or improvement of plant vigor and recruitment of young plants. 3) Native range should be grazed in such a way that a patchy appearance comprised of lightly to moderately grazed and ungrazed areas are prevalent throughout most of the pasture. The rangeland may be topped, skimmed, or grazed substantially in patches. In so doing, a combination of seasonally important habitat values important to wildlife will be present, including grazed (conditioned) forage plants and areas with high quality cover and structure (ungrazed or slightly grazed vegetation). Livestock grazing described as a thorough search (heavy trampling, limited standing herbaceous cover, and uniformly grazed key forage plants) is limited to areas near watering facilities such as troughs and reservoirs. Heavy utilization patterns do not dominate the appearance of the landscape and vegetation structure at the end of the growing season. Most young plants are undamaged subsequent to grazing use and low-value herbaceous plants are left ungrazed. 4) TNR livestock grazing use in native range should be avoided to protect forage, cover and structure values for wildlife. Where it is permitted for the attainment of other management objectives, TNR grazing use should conform to utilization levels that are less than or equal to 40 percent as defined in this document and BLM technical references. 5) Native upland range that is not grazed by domestic livestock is a desired wildlife habitat condition. It is generally in limited supply and typically provides very high quality structure and native forage for wildlife use. Maintenance of currently ungrazed native range conditions by avoiding new water developments, salting, and fencing is considered a beneficial mitigating measure for the protection of wildlife habitat values.	Appendix F-3
Southeastern Oregon	Grazing practices	Livestock grazing will be managed during and following drought to maintain soil and vegetation health and productivity.	58
Southeastern Oregon	Grazing practices	Objective 2: Restore, maintain, or improve riparian vegetation, habitat diversity, and associated watershed function to achieve healthy and productive riparian areas and wetlands.	48
Three Rivers	Grazing Restrictions	Implement grazing systems on all sage-grouse ranges to improve forb production and availability.	2-63
Human Disturbance: general			
Upper Deschutes	General Habitat; Human Disturbance	a. Design and implement management activities to be consistent with adopted sage-grouse conservation strategies and current, accepted science. b. Vegetation-altering activities may occur in sage-grouse habitat where it does not result in the long-term loss of habitats or contribute to the need to list. c. Disturbance activities may occur in sage-grouse habitat if they do not disrupt breeding and over-wintering activities or compromise habitat suitability.	46
Brothers-Lapine	Human Disturbance	Sage-Grouse Spring-Summer-Fall Range: Projects will be limited to no more than 60 percent of the area in any 10-year period with emphasis on mosaic patterns, creation of edge, and retention of important cover.	89
Brothers-Lapine	Human Disturbance	Sage-Grouse Wintering Areas: These areas can only be considered for treatment after adequate consideration and planning have been given to the present and future wintering sage-grouse populations found in each specific area.	89

Plan	GRSG Topic	Description of Management	Page
Brothers-Lapine	Human Disturbance	Seasonal restrictions will be applied to mitigate the impacts of human activities on important seasonal wildlife habitat. Examples of the major types of important seasonal wildlife habitat are crucial deer winter range, sage-grouse nesting habitat, and raptor nesting habitat.	97
Lakeview	Human Disturbance; Habitat Fragmentation	The high concentration of Greater Sage-Grouse leks in the High Lakes ACEC will be managed to maintain the continuity of Greater Sage-Grouse habitat and to avoid disturbance during the breeding season.	67
Human Disturbance: Recreation			
Upper Deschutes	OHV Restrictions	New trails and developments will be designed and constructed to avoid or minimize conflicts with known raptor and sage-grouse areas. Existing trails and developments will be managed to avoid or minimize conflicts with those areas which may be known or are identified in the future. Management in these areas may include trail closure, trail relocation, or season of use restrictions.	107
Human Disturbance: Lands and Realty			
Upper Deschutes	Land and Realty	Prioritize parcels for acquisition to meet management objectives based on the potential for imminent development. These objectives could include the following considerations (note: these are not in order of priority): Parcels that contain important habitat for special status species and other species of high public interest or concern, including sage-grouse.	145
Lakeview	Human Disturbance: Lands and Realty	New rights-of-way (ROWs) will be avoided in Greater Sage-Grouse breeding habitat. Most of north Lake County will be designated as limited to existing roads and trails year-round to protect wildlife habitat.	50
Lakeview	Land and Realty	All ACECs, Wild and Scenic Rivers (WSRs), the Buck Creek Watchable Wildlife Site, and Greater Sage-Grouse breeding habitat will be designated ROW avoidance areas except for ROW that will not conflict with management objectives for the area (see Map L-8).	94
Andrews/ Steens	Human Disturbance: Lands and Realty	Wind energy development will be restricted from ROW, realty use, and renewable energy avoidance and exclusion zones as identified in the RMP and the portion of the Steen Mountain CMPA in the planning area.	Plan Maintenance Sheet AMU-3
Three Rivers	Human Disturbance: Lands and Realty	It will be clarified that wind energy development is allowed on a case-by-case basis in areas outside rights-of-way and land use authorization avoidance and exclusion zones. Wind energy development will be restricted from rights-of-way and land use authorization avoidance and exclusion zones identified in the RMP and the portion of the Steens Mountain CMPA in the planning area.	Plan Maintenance Sheet TR-1
Lakeview	Human Disturbance: Lands and Realty	New rights-of-way will be avoided in GRSG breeding habitat (Map L-8). Most of north Lake County will be designated as limited to existing roads and trails year-round to protect wildlife habitat.	Unknown
Human Disturbance: Minerals, Oil and Gas			
AMU	Minerals, Oil and Gas	Areas that will be recommended for withdrawal under 43 CFR 2300 from locatable mineral exploration and development include existing BLM recreation and administrative sites, potential BLM recreation sites when development is approved, National Register-listed cultural sites, significant paleontological localities, areas containing federally listed species and designated critical habitat, and land within 0.6 mile of sage-grouse leks. Approximately 447,464 acres are open to locatable mineral exploration and development under a notice or plan of operation, and 20,367 acres are closed.	48
AMU	Minerals, Oil and Gas	Areas of seasonal or special stipulations include big game winter range, areas containing federally listed species and their designated critical habitat, and land within 0.6 mile of sage-grouse leks.	48

Plan	GRSG Topic	Description of Management	Page
AMU	Minerals, Oil and Gas	Salable minerals development is permitted throughout the AMU on a case-by-case basis except on land closed by Congressional action and the Wilderness Study Area (WSA) IMP, in Areas of Critical Environmental Concern (ACECs), existing BLM administrative and recreation sites, potential BLM recreation sites, National Register-listed cultural sites, significant paleontological localities, areas containing federally listed species and their designated critical habitat, and within 0.6 mile of sage-grouse leks.	49
Brothers-Lapine	Human Disturbance; Minerals, Oil and Gas	The no surface occupancy stipulation on 16,480 acres around Prineville Reservoir and seasonal restrictions on 44,580 acres of deer wintering areas and 3,560 acres of sage-grouse strutting grounds would continue.	13
Brothers-Lapine	Human Disturbance; Minerals, Oil and Gas	Sage-Grouse Habitat (2-Mile Radius of Strutting Grounds): Projects within the two-mile radius of strutting grounds will be planned for selective control in a manner that will not adversely impact present and future nesting sage grouse populations. Within the one-mile radius zone shrub reduction projects will be highly selective.	89
Lakeview	Human Disturbance; Locatable Minerals	About 1,647,544 acres will be open to locatable mineral development, but subject to a combination of protective stipulations, including: preparing a plan of operations, seasonal restrictions, and special visual design measures; primarily in areas of big game winter range, Greater Sage-Grouse breeding habitat, one suitable wild and scenic river, and Visual Resource Management Classes I and II (see Map M-10).	90
Lakeview	Human Disturbance; Mineral leasing	About 817,789 acres will be open to mineral leasing but subject to no-surface-occupancy restrictions, primarily in some ACECs and all Greater Sage-Grouse breeding habitat (see Map M-9).	91
Lakeview	Human Disturbance; Salable Minerals	About 676,150 acres of confirmed Greater Sage-Grouse breeding habitat will be included in the surface occupancy avoidance category (see Map M-8).	91-92
Lakeview	Human Disturbance; Mineral Leasing	Surface occupancy and use related to mineral leasing shall be prohibited within 0.6 mile of known or occupied breeding habitat.	A-175
Lakeview	Human Disturbance; Locatable Minerals	Special status species (Federal candidate/BLM sensitive) of plants and animals, and their habitat, will be identified by the resource area manager, and shall be avoided whenever possible.	A-178 to A-179
Lakeview	Minerals, Oil and Gas	About 676,150 acres of confirmed Greater Sage-Grouse breeding habitat will be included in the surface occupancy avoidance category.	91
Southeastern Oregon	Minerals, Oil and Gas	Timing limitations will be applied to land where the resource values (such as raptor nesting, sage-grouse leks, or big game winter range) cannot be adequately protected by the standard lease terms, but yet do not require a yearlong restriction on leasing operations. Less restrictive stipulations (such as controlled surface use or standard stipulations) were considered in developing this stipulation, but it was concluded that they would not afford sufficient protection to the known and suspected resources found on the parcels.	30
Southeastern Oregon	Minerals, Oil and Gas	There will also be areas where a seasonal or other special stipulation will be applied to protect values identified. These areas include some ACECs; a 0.5-mile buffer around sage-grouse leks; big game winter ranges; areas of special status plant and animal species and their essential habitat; and RCAs.	30

Plan	GRSG Topic	Description of Management	Page
Southeastern Oregon	Minerals, Oil and Gas	Sage-grouse breeding activity could be disrupted by lease activity during the strutting season. A No Surface Occupancy stipulation will be applied within 0.5 mile of these sites between March 1 and June 1 of each year. The authorized officer may grant an exception to the stipulation if site-specific environmental analysis indicates that an action would not interfere with sage-grouse strutting. The authorized officer may modify the size and timeframes of the stipulation if monitoring indicates that current sage-grouse use patterns are inconsistent with dates established for animal occupation, or if the proposed action could be conditioned so as to not interfere with sage grouse strutting. This stipulation may be waived by the authorized officer if monitoring determines that all or specific portions of the lease area no longer satisfy this functional capacity.	34
Steens	Minerals, Oil and Gas	Saleable minerals development is permitted in the CMPA, for road maintenance only, at locations identified in the Steens Act. Those sites are outside Wilderness, WSAs, designated segments of the National WSR System, ACECs, existing BLM administrative and recreation sites, and potential BLM recreation sites. Development is not permitted in those parts of the sites that are within National Register-listed cultural sites, significant paleontological localities, areas containing Federally listed species and their designated critical habitat, and within 0.6 mile of sage-grouse leks.	49
Monitoring			
Baker	General Habitat; Monitoring	Continue inventories, develop and implement habitat management plans to protect or enhance important wildlife habitat for big game animals, native fisheries, bald eagles and other raptors, and native game birds including sage-grouse and Columbian sharp-tailed grouse.	ii
Baker	Monitoring	Continue inventories initiated on sage-grouse to determine nesting, brood rearing, and wintering habitat areas.	19
Lakeview	Monitoring	In conjunction with other private, state, or federal agencies, continue to monitor known populations of special status species considered to be sagebrush obligates (such as Greater Sage-Grouse, pygmy rabbit, and kit fox).	52
Lakeview	Monitoring	Annually or semiannually assess landscape changes in big sagebrush habitats from wildfire, prescribed fire, vegetation treatments, insect infestations, or other major influences. These changes will be mapped using global positioning system, geographic information system, and remote sensing technologies. The number of acres will be reported for each type of action. Assessments will be based on changes in size and composition of big sagebrush habitats. Changes will reflect suitability for sagebrush-dependent species. Big sagebrush and other wildlife habitats will be evaluated periodically during Rangeland Health Assessments and after major catastrophic events such as large-scale wildfire. Annually or biannually monitor areas where habitat treatments occur. Use photo points and vegetation sampling techniques that include species and structural composition of the area before and after treatment, if possible.	51
Southeastern Oregon	Monitoring / Adaptive Management	The concept of adaptive management uses the latest scientific information, site-specific information/data, and professional judgment to select the management strategy most likely to meet goals and objectives. The concept also acknowledges the need to manage resources under varying degrees of uncertainty as well as the need to adjust to new information. Through continually adjusting management strategies as needed, supported by monitoring or additional information, adaptive management will result in attainment of short- and long-term trend toward meeting objectives. Adaptive management provides the capability to respond quickly to monitoring data with consideration given to past season monitoring or preseason conditions.	111
Southeastern Oregon	Monitoring	Over the life of this plan, vegetation communities will be monitored to determine progress toward attaining DRFCs. Monitoring to determine success in meeting vegetation management objectives will include periodic measurements of plant composition, vigor, and productivity as well as measurement of the amount and distribution of plant cover and litter that protects the soil surface from raindrop impact, detains overland flow, protects the surface from wind erosion, and retards soil moisture loss through evaporation.	40

Plan	GRSG Topic	Description of Management	Page
Three Rivers	Monitoring; General Habitat	1. Inventory all sage-grouse habitat for strutting grounds. 2. Ensure that sufficient sagebrush is retained on a case-by case basis via the National Environmental Policy Act (NEPA) process.	2-75
Upper Deschutes	Monitoring	Map the locations of active and historic important wildlife habitats (i.e., raptor nests, deer, elk and pronghorn winter range, sage grouse leks, etc.). Periodically monitor these habitats and survey potential habitats for additional activity. Map the land use activities that may cause negative impacts on these habitats.	51
Upper Deschutes	Monitoring	In conjunction with other private, state, or federal agencies, continue to monitor wildlife populations associated with source habitats in the planning area. Do this at several scales: • For individual species such as bald and golden eagles, sage-grouse, deer, elk, and pronghorn. • Groups of species associated with source habitats such as shrub-steppe, juniper, and ponderosa pine.	166
Special Designations – Areas of Critical Environmental Concern			
Southeastern Oregon	ACEC – surface disturbance	Most ACECs are identified as ROW Avoidance Areas, while the balance are Exclusion Areas. Additionally, most are proposed for withdrawal for Locatables and Closed or Withdrawn from Salables and Leasable minerals.	Table 13, p. 69
Multiple RMPs			
	Livestock Grazing	Implement the *GRSG Programmatic Candidate Conservation Agreement for Livestock Grazing Practices on BLM Lands in Oregon*. Where there is also a Candidate Conservation Agreement with Assurances for private lands, BLM will coordinate with the private land owner who has a BLM grazing allotment permit.	Unknown
	Energy development	Record of Decision: Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments, dated 12/15/2005. The Land Use Plans that were updated included Andrews/Steens, Brothers/LaPine, SE Oregon, Three Rivers, Two Rivers, and Upper Deschutes RMPs.	Unknown
	Energy development	The Brothers/LaPine SE Oregon, Two Rivers, and Upper Deschutes RMPs state, "Programmatic policies and BMPs in the Wind Energy Development Program will be adopted."	Unknown

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Appendix C

Required Design Features and Best Management Practices

APPENDIX C
REQUIRED DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

REQUIRED DESIGN FEATURES

Required Design Features (RDFs) are required for certain activities in all GRSG habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.

The RDFs are applicable to PHMA and GHMA unless otherwise indicated for Alternatives B, C, D, and F, and the Proposed Plan in this RMPA/EIS.

Common to All

1. Cluster disturbances, operations and facilities.

2. Minimize authorizations to reduce disturbance to sagebrush habitats.
3. Restrict the construction of fences and tall structures to the minimum number and amount needed. Tall structures are any man-made structure that has the potential to disrupt lekking or nesting birds by creating perching/nesting opportunities for predators (e.g., raptors, ravens) or decrease the use of an area by sage-grouse. This includes but is not limited to communication towers, meteorological towers, electrical transmission or distribution towers, power poles, wind turbines, and associated structures.
4. Design or site permanent structures that create movement (e.g. a pump jack) to minimize impacts on sage-grouse.
5. Construct new ROW, tanks, and other structures with perch deterrents or other anti-perching devices, and with structures or devices that discourage nesting of raptors and corvids.
6. Refer to the model by Bryan Stevens (2011) to identify fences that pose a threat to sage-grouse. Remove any unneeded or unused fences and mark needed fences with anti-strike markers if the fence poses a threat to the sage-grouse. Remove or mark fences within 1.2 mile of newly discovered leks that were not included in the model. Update the model when new leks are found (PHMA only).
7. Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.
8. Clean up refuse and eliminate subsidized food sources for Greater Sage-grouse predators.
9. Provide training to all personnel and contractors on greater sage-grouse biology, habitat requirements, and identification of local areas used by the birds.
10. Locate on-site work/project camps and staging areas outside of priority habitat (PHMA only).
11. Powerwash all vehicles and equipment involved in land and resource management activities prior to entering the project area to minimize the introduction and spread of invasive plant species.
12. Use native plant species; locally sourced where available, recognizing that use of non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
13. Ensure proposed sagebrush treatments are planned with interdisciplinary input from BLM and /or state wildlife agency biologist and promote use by sage-grouse.
14. Reduce encroaching conifer cover to zero within one mile of all occupied or pending leks and to less than 5% within 4 miles of such

leks. Retain all trees that originated prior to 1850 (old trees), culturally significant, and trees in active use by special status species (e.g. nest, den, and roost trees) and all old growth stands of juniper within 4.0 miles of occupied or pending leks. See OSU Technical Bulletin 152, or its successor, for the key characteristics of old trees. Old growth stands are those where the dominant trees in the stand meet the key characteristics for old trees.

15. Focus restoration outward from existing intact habitat.
16. Consider using available organic material or mats to reduce vegetation disturbance for activities and for roads between closely spaced authorizations to reduce soil compaction and maintain soil structure for increasing the likelihood of vegetation reestablishment. Remove or incorporate cover at the decommissioning stage of the project or authorized use period.
17. Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.
18. Minimize unnecessary cross-country vehicle travel during field and fire operations in sage-grouse habitat.
19. There will be no disruptive activities two hours before sunset to two hours after sunrise from March 1 through June 30 within 1.0 miles of the perimeter of occupied leks, unless brief occupancy is essential for routine ranch activities (e.g., herding or trailing livestock into or out of an area at the beginning or end of the grazing season). Disruptive activities are those that are likely to alter sage-grouse behavior or displace birds such that reproductive success is negatively affected or an individual's physiological ability to cope with environmental stress is compromised. Examples of disruptive activities may include noise, human foot or vehicle traffic, or other human presence.
20. Remove all branches on cut juniper stumps to prevent regrowth. Remove branches on cut trees that extend more than four feet above the ground or more than one foot above the general height of the sagebrush to eliminate potential perch sites for Greater Sage-grouse predators.

Roads

1. Construct road crossings at a right angle to ephemeral drainages and any stream crossings.
2. Utilize existing roads, or realignments of existing roads to the extent possible.
3. Coordinate road construction and use among ROW holders.

4. Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
5. Locate and build new roads to avoid important areas and habitats.
6. Restrict vehicle traffic on newly constructed project access routes to only authorized users (e.g. through use signing and gates)(PHMA only).
7. Use dust abatement practices on roads and pads when authorizing activities where dust abatement is necessary.
8. Eliminate parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography.

Reclamation

1. Maximize the area of interim reclamation on long-term access roads and other disturbances including reshaping, topsoiling, and revegetating cut and fill slopes.
2. Restore disturbed areas at final reclamation and duplicate roads to the pre-disturbance landforms and desired plant community.
3. Irrigate sites during interim reclamation, if necessary, for the purpose of establishing seedlings more quickly.
4. Utilize mulching techniques to expedite reclamation and to protect soils.
5. Include restoration objectives to meet sage-grouse habitat needs during reclamation (Pyke, 2011). Address post-reclamation management in reclamation plan so that clear goals and objectives are known to enhance or restore sage-grouse habitat.

Lands and Realty

1. Bury distribution power lines and communication lines, preferably within existing disturbance (PHMA only).

Fluid Minerals Development

1. Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).
2. Use directional and horizontal drilling to reduce surface disturbance.
3. Apply a phased development approach with concurrent reclamation.
4. Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.
5. Use only closed-loop systems for drilling operations and no reserve pits.

6. Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile Virus. If surface disposal of produced water continues, refer to the West Nile Virus RDFs.
7. Place pipelines, transmission lines, or other infrastructure under or immediately adjacent to a road or other infrastructure first, before locating with other ROWs.

Fire, Fuels and Vegetation

Vegetation and Fuels Management

1. Where applicable, design treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.
2. When treating dense sagebrush with prescribed fire:
    a. Design burn prescriptions to limit fire spread.
    b. Target individual sagebrush plants or small patches of sagebrush with at least 50 percent dead crown.
    c. Ensure burn patches are well-distributed through the treatment block.
    d. In warm-dry sagebrush do not count burn patches of <0.25 acres towards the maximum allowed stand-replacement area.
    e. In cool-moist sagebrush do not count burn patches of <0.5 acres towards the maximum allowed stand-replacement area.
3. Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts).
4. Use native plant species; locally sourced where available, recognizing that use of non-native species may be necessary to achieve site-specific management objectives.
5. Fuel Breaks:
    a. Incorporate roads and natural fuel breaks into fuel break design, where applicable.
    b. Design fuel breaks in areas of high fire frequency to facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat.

c. Develop maps of existing fuel breaks in relation to sage-grouse habitat to assist wildfire response activities.

d. Use perennial vegetation (e.g., green-strips) paralleling road rights-of-way.

e. Incorporate key habitats or important restoration areas (such as where investments in restoration have already been made) in fuel break design.

Fire Operations

1. Compile District level greater sage-grouse information into state-wide tool boxes. Tool boxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each District, which will be aggregated into a state-wide document.

2. Assign a resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve ODFW in fire operations through:

    a. Instructing resource advisors during preseason trainings;

    b. Qualification as resource advisors;

    c. Coordination with resource advisors during fire incidents;

    d. Contributing to incident planning with information such as habitat features or other key data useful in fire decision making.

3. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

4. Use existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.

5. During periods of multiple fires, ensure line officers are involved in setting priorities.

6. Minimize burnout operations in key sage-grouse habitat areas by constructing direct fireline whenever safe and practical to do so.

7. Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage.

8. When safe, maintain and protect areas of unburned islands and fingers of sagebrush and treat these areas as a highly valued resource to be protected. Safe and risk based use of aircraft and

mechanized equipment should be considered in order to keep fire from burning out these islands.

9. On all fires, clearly document the following as they apply:
    a. Locations and sizes of burnout operations
    b. Locations of mechanical firelines
    c. Locations of retardant drops
    d. Interagency coordination concerning the strategy and tactics used
    e. Resource advisors used (name and whether GRSG "qualified", see RDF #2 under Fire Operations)
    f. Summaries of weather and fire behavior, particularly during major growth events
    g. Whether ES&R is anticipated to occur.
10. Coordinate with Rangeland Fire Protection Associations (RFPAs) and Rural Fire Protection Districts (RFPDs) to increase initial attack and extended attack capability and effectiveness.
    a. Establish minimum requirements for personal protective equipment (PPE), training, experience and qualifications, physical fitness levels, and currency standards for wildland fire positions which all participating agencies agree to meet (NWCG 310-1)
    b. Assist RFPAs and RFPDs in meeting agreed upon minimum standards by providing joint training and development opportunities.
    c. Develop interagency training exercises with local, state, and federal agencies to enhance safety, coordination, communication, and effectiveness during fire management operations.
    d. Utilize interagency "closest available forces" protocol for dispatching qualified firefighting resources to initial attack fires within 5 years.
11. Locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, helicopter landing areas) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.

Livestock Grazing

1. Do not place salt or mineral supplements within 1.0 miles of the perimeter of an occupied lek.
2. Do not concentrate livestock in nesting habitat or leks from March 1 through June 30. The timing and location of livestock turnout and trailing should not contribute to livestock concentrations on leks during the sage-grouse breeding season.
3. Locate new and/or relocate livestock water developments within sage-grouse habitat to maintain or enhance habitat quality.
4. Spring developments should be constructed or modified to maintain their free-flowing, natural, and wet meadow characteristics.
5. Fence wetlands (e.g., springs, seeps, wet meadows and/or riparian areas) where appropriate, to maintain or foster progress toward Proper Functioning Condition and to facilitate management of sage-grouse habitat objectives. Where constructing fences or exclosures to improve riparian and/or upland management, incorporate fence marking or other BMPs/RDFs as appropriate.
6. Ensure wildlife accessibility to water and install escape ramps in all new and existing water troughs.
7. Construct new livestock facilities (livestock troughs, fences, corrals, handling facilities, "dusting bags," etc.) at least 1.0 miles from leks or other important areas of sage-grouse habitat (i.e., wintering and brood-rearing areas) to avoid concentration of livestock, collision hazards to flying birds, or avian predator perches.
8. Place new, taller structures, including corrals, loading facilities, water storage tanks, windmills, out of line of sight or at least 1.0 miles from occupied leks, where such structures would increase the risk of avian predation.

Noise (RDFs apply to all activities)

1. Limit noise at the perimeter of occupied or pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season to less than 10 decibels above ambient sound levels.
2. Require noise shields for noise creating authorizations (e.g. drilling).
3. Locate new compressor stations and other noise creating authorizations outside priority habitats and design them to reduce noise that may be directed towards priority habitat.

West Nile Virus

1. Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).

2. Use the following steps for reservoir design to limit favorable mosquito habitat:
    a. Overbuild size of ponds for muddy and non-vegetated shorelines.
    b. Build steep shorelines to decrease vegetation and increase wave actions.
    c. Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
    d. Construct dams or impoundments that restrict down slope seepage or overflow.
    e. Line the channel where discharge water flows into the pond with crushed rock.
    f. Construct spillway with steep sides and line it with crushed rock.
    g. In areas experiencing a West Nile Virus outbreak, treat waters with larvicides to reduce mosquito production where water occurs on the surface.

Locatable Minerals Development (RDFs apply to locatable minerals to the extent consistent with applicable law)

Roads

1. Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
2. Locate and build new roads to avoid important areas and habitats.
3. Coordinate road construction and use among ROW holders.
4. Construct road crossing at right angles to ephemeral drainages and any stream crossings.
5. Restrict vehicle traffic on newly constructed project access routes to only authorized users (e.g. through use signing and gates) (PHMA only)
6. Use dust abatement practices on roads and pads when authorizing activities where dust abatement is necessary.
7. Eliminate parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography.

Operations

1. Cluster disturbances, operations, and facilities.

2. Place pipelines, transmission lines, or other infrastructure under or immediately adjacent to a road or other infrastructure first, before locating with other ROWs.
3. Restrict the construction of fences and tall facilities to the minimum number and amount needed. Tall structures are any man-made structure that has the potential to disrupt lekking or nesting birds by creating perching/nesting opportunities for predators (e.g., raptors, ravens) or decrease the use of an area by sage-grouse. This includes but is not limited to communication towers, meteorological towers, electrical transmission or distribution towers, power poles, wind turbines, and associated structures.
4. Minimize authorizations to reduce disturbance to sagebrush habitats.
5. Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.
6. Bury distribution power and communication lines, preferably within existing disturbance (PHMA only).
7. Cover (e.g., fine mesh netting or use other effective techniques) all pits (mining-related water filled impoundment) and tanks regardless of size to reduce sage-grouse mortality.
8. Construct new ROW, tanks, and other structures with perch deterrents or other anti-perching devices, and with structures or devices that discourage nesting of raptors and corvids.
9. Use native plant species; locally sourced where available, recognizing that use of non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
10. Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).
11. Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
    a. Overbuild size of ponds for muddy and non-vegetated shorelines.
    b. Build steep shorelines to decrease vegetation and increase wave actions.
    c. Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
    d. Construct dams or impoundments that restrict down slope seepage or overflow.

e. Line the channel where discharge water flows into the pond with crushed rock.

f. Construct spillway with steep sides and line it with crushed rock.

g. Treat waters with larvicides to reduce mosquito production where water occurs on the surface.

12. Require sage-grouse-safe fences around sumps.

13. Clean up refuse and eliminate subsidized food sources for Greater Sage-grouse predators.

14. Locate on-site work/project camps outside of priority sage-grouse habitats (PHMA only).

Reclamation

1. Include restoration objectives to meet sage-grouse habitat needs during reclamation. Address post-reclamation management in reclamation plan so that goals and objectives are to enhance and restore sage-grouse habitat.

2. Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.

3. Restore disturbed areas at final reclamation to pre-disturbance landform and desired plant community.

4. Irrigate sites during interim reclamation, if necessary, for the purpose of establishing seedlings more quickly.

5. Utilize mulching techniques to expedite reclamation and protect soils.

BEST MANAGEMENT PRACTICES

The majority of management actions and practices specifically applicable to greater sage-grouse and the purpose and need of this document are addressed in the Required Design Feature portion of this appendix. The following best management practices (BMPs) are additional management actions and practices. They were developed from the National Technical Team (NTT) Report and other sources and are also BMPs for Alternatives B, C, D, and F, and the Proposed Plan in this RMPA/EIS.

The BMPs are applicable to PHMA and GHMA unless otherwise indicated.

Post Fire and Restoration Seeding

1. Use ecological site descriptions to determine appropriate seed mixes. Seed mixes should include a diversity of forbs that maximize blooming times when pollinators are most active and include nectar and pollen-producing plants.

2. When using locally collected seed, handle and store seed properly to maintain maximum viability.
3. When using non-native grasses, do not mix crested wheatgrass (*Agropyron cristatum* or *A. desertorum*) with native perennial grass species. If crested wheatgrass is needed to compete with invasive annual grasses, use a non-native grass mix.
4. Prefer minimum-till and standard drill seeding to aerial or broadcast seeding, particularly to control invasive annual grasses. Where possible, prefer minimum-till drill seeding to standard drill seeding.
5. Where live Sandberg bluegrass (*Poa secunda*) is well distributed post-fire or after vegetation treatment, do not drill seed as drill seeding reduces surviving Sandberg bluegrass with little concomitant establishment of seeded grass species.
6. In areas where average annual precipitation is less than 10-12 inches, test alternative and experimental methods, such as use of coated seed, to establish perennial grasses, particularly when using native species. Limit seeding to priority areas within these low precipitation zones to meet vegetation objectives and favor drought-tolerant forbs and grasses.
7. Prefer planting sagebrush and other shrubs to aerial or drill seeding until alternative methods for seeding are developed. Plant on microsites with a higher probability of success, such as at higher elevation, on northerly aspects, higher precipitation zones, or in deeper soils to create sagebrush patches rather than uniform spacing of individuals.
8. In large burn areas or similar settings, where nearly all or all sagebrush has been lost and where annual grass dominance is considered unlikely, plant sagebrush as scattered islands. Exclude such areas from grazing by domestic livestock and wild horses and burros until sagebrush establishment objectives are met.
9. Focus seeding treatments within 4 miles of occupied and pending leks and lek complexes with designated PHMA a higher priority than designated GHMA. Within PHMA, higher priority areas to treat are leks or lek complexes with a higher number of birds, on average, and leks or lek complexes with stable or increasing greater sage-grouse populations.
10. Perennial grass should be seeded at no more than 3-5 lb/ac PLS[1] if big sagebrush establishment is one of the treatment objectives.
11. Limit forage kochia use to fuel breaks, road edges, under powerlines and other areas expected to see regular disturbance, such as

[1] Pure live seed

mowing, as part of the maintenance needed to maintain the function of the site. Forage kochia may be used in other areas on a case-by-case basis; document the rationale for why forage kochia is needed and why a native species cannot be used instead.

12. Rest seeded and planted areas from grazing by livestock for at least two growing seasons. When possible, exclude seeded or planted areas from wild horses and burros as well. Grazing should not resume until vegetation objectives have been met. Plans must clearly describe the vegetation objectives and how attainment will be measured and determined.

West Nile Virus

1. Fence pond site to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.

Livestock Grazing

1. Off-trail vehicle use, where authorized, should be restricted to areas >2 miles from leks during the breeding season unless travel is essential for routine ranch activities (including but not limited to: repairing fence, "doctoring" livestock, finding lost livestock).

Travel Management

1. Allow primitive roads to reclaim naturally, and where necessary, use pitting, water bars, vertical mulch, to create physical structures that accelerate native vegetation growth.
2. If possible, attempt to disguise road entrances to discourage use, by using vertical mulch, native seeding, and natural barriers that blend in with the natural surroundings.
3. Inspect closed roads to ensure that vegetational stabilization measures are operating as planned, drainage structures are operational, and noxious weeds are not providing erosion control. Conduct vegetation treatments and drainage structure maintenance as needed.
4. Fully decommission or obliterate temporary roads upon completion of use.
5. Consider decommissioning or fully decommissioning low volume permanent roads not needed for future resource management located in, or draining into wetlands, riparian management areas, floodplains or waters of the state.
6. Prevent use of vehicular traffic using methods such as gates, guard rails, earth/log barricades, to reduce or eliminate erosion and sedimentation due to traffic on roads when possible.

7. Convert existing drainage structures such as ditches and cross drain culverts to a long-term maintenance free drainage configuration such as outsloped road surface and waterbars.
8. Remove stream crossing culverts and entire in-channel fill material during ODFW instream work period.
9. Place excavated material from removed stream crossings on stable ground outside of wetlands, riparian management areas, floodplains and waters of the state. In some cases material could be used for recontouring old road cuts or be spread across roadbed and treated to prevent erosion.
10. Reestablish stream crossings to the natural stream gradient. Excavate sideslopes back to the natural bank profile. Reestablish natural channel width and floodplain.
11. On each side of a stream crossing, construct waterbars or cross ditches that will remain maintenance free.
12. Following culvert removal and prior to the wet season, apply erosion control and sediment trapping measures (e.g., seeding, mulching, straw bales, jute netting, native vegetative cuttings) where sediment can be delivered into wetlands, riparian management areas, floodplains and waters of the state. Note: Be aware that some desert soils do better with no decompaction, such as aridisoils. These soils often have near surface layers that retain water, while physical treatments such as ripping may disturb those layers, always consult your soils scientist. Implement decompaction measures, including ripping or subsoiling to an effective depth. Treat compacted areas including the roadbed, landings, construction areas, and spoils sites.
13. After decompacting the road surface, pull back unstable road fill and either end-haul or recontour to the natural slopes.
14. On active haul roads, during the wet season, use durable rock surfacing and sufficient surface depth to resist rutting or development of sediment on road surfaces that drain directly to wetlands, floodplains and waters of the state.
15. Prior to winter hauling activities, implement structural road treatments such as: increasing the frequency of cross drains, installing sediment barriers or catch basins, applying gravel lifts or asphalt road surfacing at stream crossing approaches, and cleaning and armoring ditchlines.
16. Suspend commercial use where the road surface is deeply rutted or covered by a layer of mud or when runoff from the road surface is causing a visible increase in stream turbidity in the receiving stream.

Appendix D

Adaptive Management Strategy

APPENDIX D
ADAPTIVE MANAGEMENT STRATEGY

INTRODUCTION

Adaptive Management is a decision process that promotes flexible resource management decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps with adjusting resource management directions as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a trial and error process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. On February 1, 2008, the Department of the Interior published its Adaptive Management Implementation Policy (522 DM 1) and in 2009 a technical guide (Williams et al. 2009). The adaptive management strategy presented within this EIS complies with this policy and direction.

In relation to the BLM and Forest Service's National Greater Sage-grouse Planning Strategy (BLM 2012), adaptive management will help identify if GRSG conservation measures presented in this EIS contain the needed level of certainty for effectiveness. Incorporating principles of adaptive management into the conservation measures in this plan amendment increases the likelihood that the conservation measures will be effective in reducing threats to GRSG. The following provides the adaptive management strategy for the Oregon Sub-region RMP Amendment.

ADAPTIVE MANAGEMENT OBJECTIVES

The overarching goal for this RMP amendment is to maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem on which populations depend, in cooperation with other landowners and partners. This strategy has two overarching objectives:

- Habitat. Seventy percent of the landscape within each Oregon PAC[1] that is capable of supporting sagebrush has at least five percent sagebrush canopy cover[2] and less than five percent tree canopy cover. The remaining 30 percent can include areas of juniper encroachment, non-sagebrush shrubland, and grassland that should be managed to increase available habitat within GRSG range.
- Population. GRSG population trends within Oregon PACs as indicated by counts of males at lek complexes are stable or growing[3].

Project-level effects analysis will identify an individual project's contribution toward either objective and whether a given project, as initially designed, would fail to meet the either the habitat or population objective above, thus tripping an adaptive management trigger. When an individual project would trip a trigger, consider modifying the project to avoid tripping the trigger, dropping the project, or providing mitigation to address the trigger along with justification for why the project should proceed.

ADAPTIVE MANAGEMENT THRESHOLDS (TRIGGERS)

Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting GRSG conservation objectives. BLM will use two types of triggers for specific populations and responses: soft triggers and hard triggers. These triggers are not specific to any particular project, but identify habitat and population thresholds.

Soft triggers represent an intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses. If a soft trigger is tripped, the BLM will apply more conservative or restrictive implementation (project-level) conservation measures to mitigate for the causal factor(s) in the decline of populations or habitats, with consideration of local knowledge and conditions. These types of adjustments will be made to reduce the likelihood of tripping a "hard" trigger (which signals more severe habitat loss or population declines). While there should be no expectation of hitting a hard trigger, if unforeseen circumstances occur that trip either a habitat or population hard trigger, more restrictive management will be required.

[1] Oregon Department of Fish and Wildlife, in cooperation with the SageCon Partnership, grouped the PACs within a WAFWA population initially created by the U.S. Fish and Wildlife Service (USFWS 2013a) into 20 individual units and gave each unit a unique name. BLM Oregon refers to these units as Oregon PACs.

[2] While minimum sagebrush cover for productive sage-grouse habitat is 10% (Connelly et al. 2000), the vegetation and habitat management objective is based on providing sagebrush structural classes 3, 4, and 5 (Karl and Sadowski 2005; Hagen 2011). Class 3 is >5% to 15% sagebrush canopy cover.

[3] For smaller Oregon PACs, the only applicable scale may be the entire PAC. For larger Oregon PACs, both scales may apply.

Hard triggers represent a threshold indicating that immediate and more restrictive plan-level action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the resource management plan amendment. The following sets forth the adaptive management hard and soft triggers (thresholds):

Habitat Thresholds (Triggers)

Two critical thresholds have been defined based on GRSG response to the amount of sagebrush in the landscape (Chambers et al. 2014b):

- Soft Trigger. When the area with at least 5 percent sagebrush canopy cover and less than 5 percent tree canopy cover (Baruch-Mordo et al. 2013) drops below 65 percent of the sagebrush capable area within an individual Oregon PAC but remains above 30 percent (see also Figure 2-3).
- Hard Trigger. When the area with at least 5 percent sagebrush canopy cover and less than 5 percent tree cover drops below 30 percent of the sagebrush capable area within an individual Oregon PAC or when the area supporting at 5 percent sagebrush canopy cover and less that 5 percent tree cover drops 5 percent or more in one year in the sagebrush capable area of an Oregon PAC (see also Figure 2-3).

The above percentages are based on the area within each Oregon PAC that is capable of producing a sagebrush plant community, such as big sagebrush (*Artemisia tridentata*), low sagebrush (*A. arbuscula*), silver sagebrush (*A. cana*), threetip sagebrush (*A. tripartita*), black sagebrush (*A. nova*) and stiff sagebrush (*A. rigida*) community types. Other plant community types within each Oregon PAC, such as salt desert scrub, mountain brush, aspen, marsh, and historical juniper woodland, are not included in the calculations.

Table D-1 lists the percentage of each Oregon PAC that currently supports sagebrush cover ≥5 percent and tree cover <5 percent. These data were derived from two datasets developed by the Integrated Landscape Analysis Program (ILAP 2013). Current vegetation is derived from 2011/2013 Landsat TM data, updated with information obtained from newer, post-fire plots and imagery, including the large areas burned in 2012. Potential vegetation types developed from state and transitions models includes burned areas, juniper encroachment, crested wheat grass plantings, agriculture, and other vegetation types capable of supporting sagebrush but not currently suitable for GRSG.

Table D-1
Acres and Percent of Existing and Potential Sage-grouse Habitat in Oregon PACs as of 2014

Oregon PAC	Existing Habitat Acres			Potential Habitat Acres			Total Habitat Acres	Total PAC Acres
	BLM	Other	Percent	BLM	Other	Percent		
12 Mile	113,751	220,890	83.2	25,643	41,866	16.8	402,149	431,001
Baker	89,980	153,279	75.9	20,807	56,627	24.1	320,693	336,539
Beatys	496,470	262,261	93.2	24,944	30,228	6.8	813,903	840,792
Brothers/N Wagontire	164,003	71,370	86.5	18,463	18,382	13.5	272,218	293,461
Bully Creek	145,164	48,232	73.1	51,895	19,281	26.9	264,571	279,854
Burns	13,440	8,684	68.4	6,621	3,619	31.6	32,364	35,769
Cow Lakes	115,916	33,176	62.1	67,007	24,057	37.9	240,156	249,732
Cow Valley	71,242	229,366	83.2	16,003	44,823	16.8	361,433	368,615
Crowley	314,003	82,832	81.7	68,787	20,107	18.3	485,730	491,050
Drewsey	146,114	103,072	74.4	43,038	42,677	25.6	334,901	368,707
Dry Valley/ Jack Mtn.	323,954	11,111	75.1	102,374	8,737	24.9	446,175	449,389
Folly Farm/ Saddle Butte	129,440	29,802	68.5	58,442	14,696	31.5	232,381	251,558
Louse Canyon	475,389	28,097	71.4	192,900	8,930	28.6	705,317	707,150
Picture Rock	28,084	3,416	84.7	4,828	870	15.3	37,199	42,592
Pueblos/ S Steens	126,359	53,502	87.5	15,844	9,844	12.5	205,549	208,793
Soldier Creek	166,261	46,270	73.5	59,775	16,667	26.5	288,973	295,424
Steens	80,322	26,415	64.3	53,004	6,323	35.7	166,064	185,730
Trout Creeks	195,719	17,428	62.1	120,114	10,052	37.9	343,312	358,167
Tucker Hill	14,985	12,229	89.5	1,027	2,159	10.5	30,401	31,531
Warners	199,202	54,354	80.4	42,391	19,568	19.6	315,515	330,088
Total	**3,409,798**	**1,495,787**	**77.9**	**993,906**	**399,513**	**22.1**	**6,299,004**	**6,555,941**

Source: Integrated Landscape Analysis Project (ILAP)

Population Thresholds (Triggers)

BLM based the population thresholds on both interannual changes and a 5-year running mean in the estimated minimum number of males. BLM used the state-provided data on lek counts and procedures similar to what ODFW uses to fill in missing data and to estimate the minimum number of male birds each year (see Population Analysis Process for a detailed description). Although ODFW has GRSG population estimates as far back as the 1940s (Hagen 2011, p. 18), only a small number of leks were monitored prior to the 1980s. Monitored leks did not exceed 100 until the 1990s and now approaches 300 leks or lek complexes per year. By the mid-1990s, ODFW considered the data robust enough to calculate 5-year running means. Data quantity and quality are sufficient to calculate 5-year running means for most Oregon PACs, although

data remain limited for a small number of Oregon PACs. Available data for Burns PAC is too sparse to draw any conclusions about current populations or population trends. Louse Canyon and Trout Creeks PACs do not have enough data to develop 5-year running means, requiring that BLM use only a limited amount of interannual change to assess population status. As a result, BLM developed a special hard trigger based on annual population trends for these two PACs. The hard and soft trigger thresholds calculated using data through 2014 will remain fixed for a minimum of five years. After five years, BLM, ODFW, and FWS will evaluate whether recalculating these values should occur and new thresholds established. Establishing new thresholds may require a plan amendment.

Based on observed fluctuations in both annual population and the 5-year running mean of population (**Figure D-1**), the following soft and hard triggers have been defined:

- Soft Trigger (All PACs):
  - Annual population drops by 40 percent or greater in a single year, OR
  - Annual population drops by 10 percent or greater for three consecutive years, OR
  - The 5-year running mean population drops below the lower 95% confidence interval value.
- Hard Trigger:
  - For PACs with adequate population data: the 5-year running mean population drops below the lower standard deviation value.
  - For PACs with inadequate population data (Louse Canyon and Trout Creeks): the annual population declines by a total of 60 percent or more over two consecutive years.
  - Reaching soft triggers for both population and for habitat at the Oregon PAC scale

For the 5-year running mean criteria the population trigger would be tripped the first year the mean dropped below the identified threshold. Generally, the trigger response area would be the seasonal habitat and use locations within four miles of the lek or lek complex specifically affected or the entire Oregon PAC, depending on the size of the PAC and the amount of the PAC affected. However, the response area, with the exception of the immediate hard trigger responses, could include the General Habitat Management Area linking the affected Oregon PAC to the nearest unaffected Oregon PAC, as needed.

MONITORING

Monitoring is essential to adaptive management, both to identify when a trigger has been tripped and whether management actions taken, including adaptive responses, are effective. This RMPA/EIS contains a monitoring framework plan (**Appendix G**, Greater Sage-Grouse Monitoring Framework), that includes an effectiveness monitoring component.

To determine when a soft or hard trigger for habitat has been reached, BLM intends to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies (US DOI 2004, Stiver et al. 2006, USFWS 2013a). BLM intends to use the remotely sensed data collected from the effectiveness monitoring at the mid-scale (Oregon PAC), supplemented with local data where needed and available at the lek-. BLM will make its determination concerning habitat in the fall, after the wildfire season ends.

To determine when a soft or hard trigger for population has been reached, BLM will rely on population data collected by ODFW. ODFW is responsible for monitoring GRSG populations and typically finalizes population estimates in the fall. Each fall after ODFW has finalized its population estimates, BLM in conjunction with ODFW will calculate the latest 5-year running mean of population and the degree of population change for each Oregon PAC and evaluate whether population changes and the 5-year running mean reach a soft or hard trigger.

The state of Oregon is not developing a state adaptive management strategy and has no plans to do so.

ADAPTIVE MANAGEMENT RESPONSES

Assuring meaningful adaptive responses to a soft or hard trigger for an individual Oregon PAC requires that BLM conduct a causal factor analysis. The analysis may take 3 to 6 months to complete (see discussion under Soft Trigger Responses and Hard Trigger Responses below). While the causal factor analysis is underway, BLM will consider whether certain actions should or should not proceed as planned on a case-by-case basis to limit further loss of GRSG habitat or populations. Types of actions BLM could evaluate or consider applying in or near the affected Oregon PAC during the 3 to 6 months that causal factor analysis is underway include but are not limited to:

- Halting or delaying planned broadcast burning.
- Increasing fire prevention patrols and messages.
- Increasing fire prevention inspections of motorized equipment.
- Prohibiting open campfires outside of established fire pits and outside of stoves in designated recreation areas.

- Halting or delaying planned vegetation treatments that reduce sagebrush canopy cover.
- Increasing inspections to assure best management practices for limiting the spread of invasive plants are followed on construction projects.
- Increasing surveys and survey effort to detect and treat new infestations of invasive plants, especially invasive annual grasses.
- Delaying any planned vegetation treatments until after the breeding and early brood-rearing period.
- Halting or delaying planned fuels treatments in GRSG winter range.
- Delaying issuance of new authorizations for minerals and energy development, including geothermal exploration.
- Delaying issuance of permits for mineral material disposal.
- Installing anti-perching devices on tall structures.
- Installing bird flight diverters on guy wires and fences.
- Delaying issuance of new or pending rights-of-way outside of existing designated corridors or where not co-located within previously authorized rights-of-ways, including Federal Highway Act authorizations.
- Delaying authorizations of new tall structures outside of designated corridors.
- Adjusting grazing practices to ensure retention of adequate residual plant cover and diversity in the understory.
- Delaying planned construction of new recreation facilities (e.g., kiosks, toilets, and signs) within 2 miles of occupied or pending leks.
- Increasing litter patrols in and around higher recreational use areas.
- Increasing educational contacts with visitors concerning the role of litter and garbage in attracting GRSG predators.
- Increasing enforcement efforts on existing travel restrictions.

The authorizing officer will provide formal documentation for the record on what measures or actions were taken during the causal factor analysis period.

Soft Trigger Responses

A key part of adaptive management is to identify the potential causes of the observed change in order to develop potential adaptive responses. For the purposes of this adaptive management strategy, a causal factor is most likely tied to a threat USFWS identified in its 2010 listing determination (USFWS 2010). While one or more causal factors can be linked to a habitat or population decline, this does not assume a cause-and-effect relationship. A plethora of

factors has been suggested as affecting GRSG populations and habitats throughout the species' range. These factors can interact in a myriad of complex relationships that can be difficult to tease apart. It can be difficult to separate proximate factors from ultimate factors leading to population declines.

Upon determining that a soft trigger has been reached, BLM will convene an adaptive management working team at the District level consisting of local experts for the affected resource programs and field personnel from local ODFW and FWS offices to conduct the causal factor analysis. This team will convene as soon as possible, but within one month of determining that a soft trigger has been reached. Subject to the provisions of FACA, the team may contact potentially affected stakeholders for suggestions and comments on potential adaptive responses. A list of recommended actions shall be developed as soon as possible, but no later than within three months of convening the local adaptive management team. The selected response(s) will be formally documented as a BLM district office memorandum. Additional project-level NEPA analysis may be required to implement some responses (e.g., to implement a temporary closure). Soft trigger adaptive responses may consist of actions such as:

- Prioritizing the affected Oregon PAC for restoration treatments, fuel break construction or maintenance, high resolution vegetation mapping to inform project planning, closure of and rehabilitation of unauthorized roads, installation of bird flight diverters on fences, rangeland health assessments, modification of new and existing water projects to reduce West Nile virus risks, or wild horse and burro gathers.
- Providing additional guidance for the types and timing of vegetation treatments.
- Providing additional guidance on the location and design of fuel breaks.
- Re-evaluating seed mixes and native seed sources for postfire restoration work.
- Cancelling planned recreational site improvements or developments, or vegetation treatments.
- Re-evaluating the location or design of recreational improvements or new developments (may require additional analysis under NEPA).
- Allowing only those special recreation permits in PHMA that have neutral or beneficial effects on PHMA [43 CFR Part 2031.3].
- Modifying season(s) of use, location of use, or activities allowed in a SRMA located within the affected Oregon PAC [43 CFR 8364.1].
- Moving wild horses and burros to other areas within the applicable Herd Management Area.

- Not permitting any exceptions to the NSO requirement.
- Temporarily closing areas to certain uses, such as OHV travel, mineral and energy development, geothermal exploration, and mineral materials disposal, up to 24 months (requires a Federal Register notice and additional analysis under NEPA [43 CFR 8364.1 and 43 CFR 8341.2]).
- Applying new travel restrictions (requires a Federal Register notice and additional analysis under NEPA).
- Developing alternative right-of-way routes that avoid the affected Oregon PAC for new requests.

BLM may also choose to continue certain actions conducted while the causal factor analysis was underway, such as increased fire prevention and litter patrols, increased educational efforts, and increased enforcement efforts for existing regulations, permit stipulations, and law enforcement activities.

Hard Trigger Responses

As noted above, hard triggers represent a threshold indicating that immediate and more restrictive action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the resource management plan amendment. Once BLM in consultation with USFWS and ODFW has determined that a hard trigger has been reached, it will immediately implement the following responses within the affected Oregon PAC. These responses consist of more restrictive conservation actions from one or more other alternatives analyzed in the FEIS. The applicable action from another alternative is identified in parentheses.

- Do not use prescribed fire to treat sagebrush in less than 12-inch precipitation zones. As a last resort and after all other treatment options have been explored and site-specific variables allow, use of prescribed fire for fuel breaks can be considered in stands where *annual grass* is a very minor component in the understory. (Action B-WFM 1)
- Do not conduct mechanical sagebrush treatments in known *GRSG* winter habitat. (Action E-VG 15)
- Limit broadcast burning of juniper-invaded sagebrush to no more than 160 acres *per treatment block in PHMA*. (Action E-VG 26)
- Issue no new geophysical exploration permits in PHMA. (Action C-MLS 8)
- Make PHMA exclusion areas for new ROW authorizations (Action B-LR 1)
- Restrict OHV use to areas greater than 2 miles from leks during the breeding season (March 1 through *June 30*). (Action E-TM 1) [43 CFR 8364.1 and 43 CFR 8341.2]

- When reseeding closed roads, primitive roads, and trails, use appropriate native seed mixes and require use of transplanted sagebrush (Action F-TM 6)
- Prohibit new road construction within 4 miles of active GRSG leks, *subject to valid existing rights and to protect human health and safety*. (Action F-TM 2) [43 CFR 8364.1]
- No construction of *recreational* facilities (e.g., kiosks, toilets, and signs) within 2 miles of leks. (Action E-RC 8)

After the immediate hard trigger response is put in place, the State Director will convene a statewide adaptive management working team at the State level consisting of experts for the affected resource programs and personnel from ODFW and FWS offices. This team will convene as soon as possible, but within one month of determining that a hard trigger has been reached. Subject to the provisions of FACA, the team will also contact potentially affected stakeholders for suggestions and comments on potential additional responses. Recommendations for additional responses shall be developed as soon as possible, but no later than within six months of convening the adaptive management team. If the ultimate cause cannot be determined, the adaptive response will be based on the proximate causes. If the final recommendations include any additional adaptive management responses beyond those in the list above, the State Director will issue a memorandum listing these additional response(s) and identify which responses require a plan amendment or additional plan-level analysis under NEPA. For example, an additional hard trigger response may be permanent closure to a particular use within the affected Oregon PAC. Responses may include continuation of certain actions taken while the causal factor analysis was underway, such as increased fire prevention and litter patrols, as well as site-specific project-level responses typically associated with soft triggers, such as providing additional guidance on the types and timing of vegetation treatments.

When a hard trigger is hit in Beatys, Trout Creeks, Louse Canyon, Soldier Creek, or Cow Lakes Oregon PAC (BSU; see Figure 2-3), the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project-level responses in place, as appropriate, and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in adjoining BSUs in other states and will invoke the appropriate plan response.

Exception to Hard Trigger Response

When the causal factor for a hard trigger is wildfire or insect outbreak, more restrictive allocations or management actions will be implemented (see bulleted list above) within the affected Oregon PAC. However, pending and new authorizations could continue within the affected Oregon PAC(s) if the disturbance cap has not been reached and:

a) As designed, the project would have no direct or indirect impact on the GRSG population or habitat, or

b) The project has been modified so that it would not have direct or indirect impacts on the GRSG population or habitat.

DEVELOPING RESPONSES

Adaptive Management Working Team

Upon determining that a hard trigger has been reached, and in addition to the hard trigger response that is put in place, the BLM will convene the statewide adaptive management working team. This team will help BLM to identify the causal factor(s) that may have tripped the adaptive management trigger and provide recommendations to the appropriate BLM authorizing official (decision maker) regarding adaptive responses. Membership of the team shall consist of, at minimum, a wildlife biologist, a fuels specialist, a weed coordinator or botanist, and a range management specialist from BLM and representatives at the state or regional level from FWS and ODFW. Other specialists shall be added depending on the nature of the hard trigger and the probable ultimate cause(s).

Adaptive management requires stakeholder involvement as well as agency involvement in order to succeed. The adaptive management working team will contact representatives from other federal agencies, research, environmental groups, producer groups, user groups, tribes, and local government as needed for suggestions and comments on potential final responses. The provisions under FACA may apply to input from non-governmental organizations.

If new scientific information becomes available demonstrating that one or more of the immediate hard trigger responses would be insufficient to stop the severe degradation and initiate recovery toward the GRSG conservation objectives set forth in the resource management plans, BLM will develop a new adaptive response through a plan amendment or site specific NEPA as appropriate, based on the new information, to protect GRSG and its habitat and to ensure that conservation options are not foreclosed. As a result, after a causal factor analysis is complete, implementing additional hard trigger responses could take one year or longer in order to complete the necessary environmental analysis or analyses.

Causal Factor Analysis

Identifying the ultimate cause of crossing a threshold and appropriate responses requires answering a series of questions, usually about the proximate cause, since that is often more easily observed. These questions should examine the factors supporting the proximate cause in order to better identify whether a portion of the resource management plan failed and which part, and whether an adjustment is needed. For example, a large wildfire is a likely proximate cause for tripping both a habitat and population trigger. However, the plan includes several objectives, actions, and required design features in the vegetation and wildland fire sections intended to reduce or minimize the potential to trigger an adaptive management response. The review should examine the relevant plan direction and answer a series of questions such as:

- Had all or some of the plan direction been implemented in the affected area?
- Did the plan direction perform as intended?
- Did the conditions associated with the event or activity exceed the design standards?
- What role did factors and events outside the affected area play in the event or activity outcomes?
- Did the event or outcome arise from the interaction of more than one potential causal factor?

Determining the appropriate adaptive response also requires asking a series of questions such as:

- What is the magnitude of the impact?
- Is the impact temporary or permanent?
- Can habitat or population recover on its own without intervention?
- What is the expected length of the recovery period?
- Can the management actions already included in the plan accelerate recovery or are different actions necessary?

LONGEVITY OF RESPONSES

All immediate hard trigger responses will remain in place until a plan amendment is completed to remove them or one of the following relevant conditions are met:

- If the hard trigger tripped was for habitat, removal of the immediate hard trigger responses can occur when 70 percent of the affected Oregon PAC that is capable of supporting sagebrush has at least 5 percent sagebrush canopy cover and less than 5 percent tree canopy cover, exclusive of retained old juniper (see vegetation

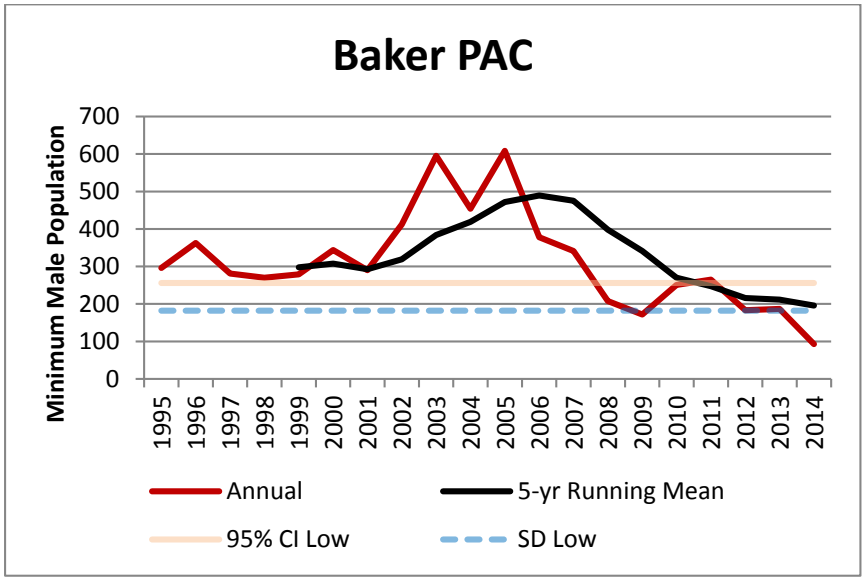
management objectives and actions for details on retention of old juniper).

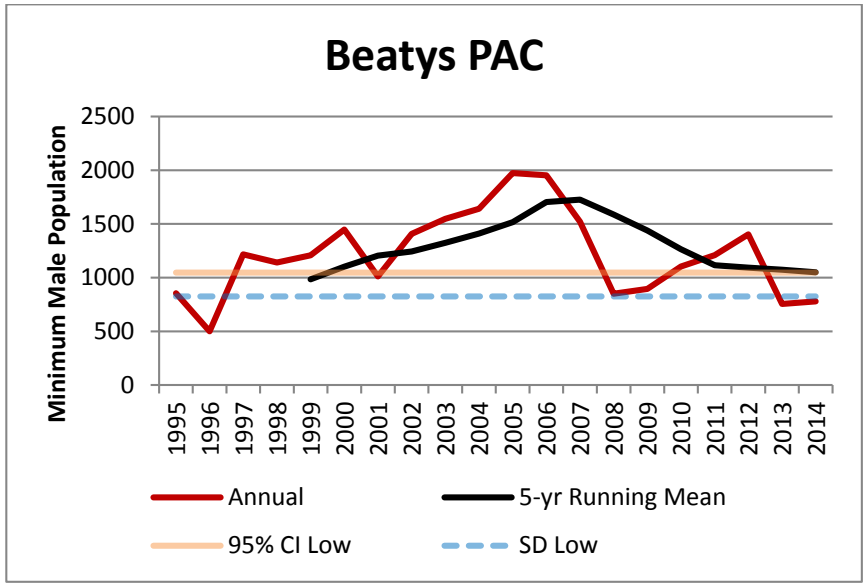
- If the hard trigger tripped was for population and the affected Oregon PAC has adequate population data (see the Population Trigger Development Process for which PACs have adequate data), removal of the immediate hard trigger responses can occur when the 5-year running mean for population rises above the lower 95th percentile confidence interval value and is on an upward trend.

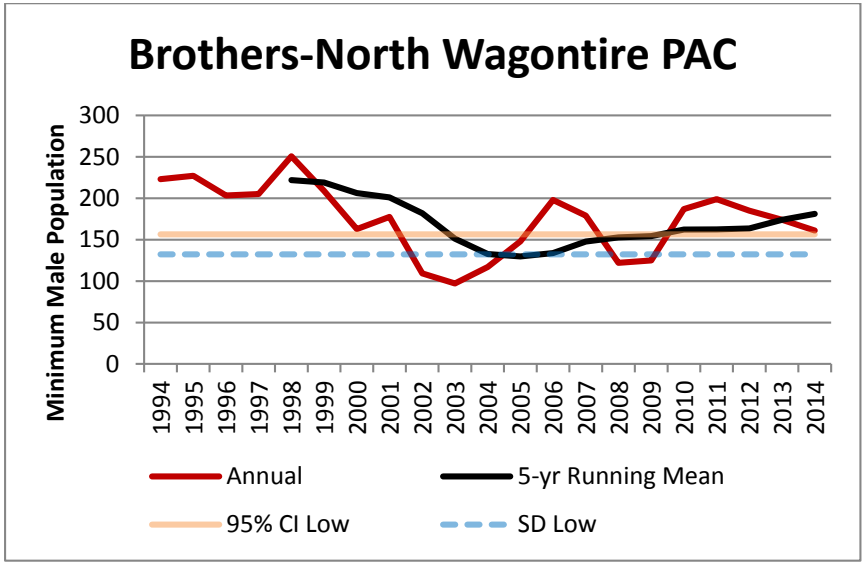
- If the hard trigger tripped was for population and the affected Oregon PAC did not have adequate population data, additional criteria apply. Once the criteria below are met, the immediate hard trigger responses can be removed if the 5-year running mean for population is or rises above the lower 95th percentile confidence interval value and is on an upward trend.
  - A minimum of 12 years of population data are available,
  - At least one lek/lek complex has been monitored for the full 12 years, and
  - A 5-year running mean and 95th percentile confidence interval have been calculated.
- If the hard triggers for both habitat and population were tripped then removal of the immediate hard trigger responses can occur once both the habitat and population criteria above were met.

Removal of the immediate hard trigger responses returns management direction in the affected Oregon PAC to the plan decisions that are in force within those Oregon PACs that have not tripped a hard trigger.

Figure D-1 Population Status of Each PAC Relative to the Soft and Hard Triggers







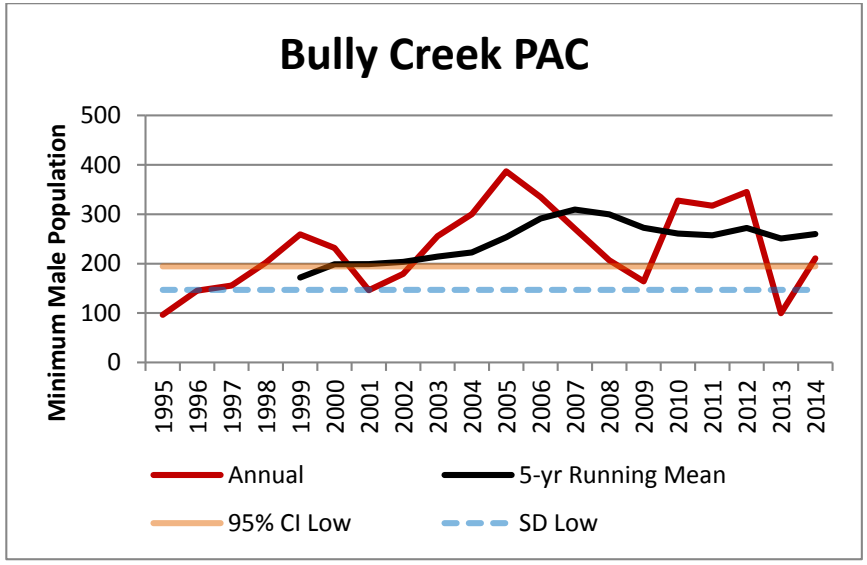
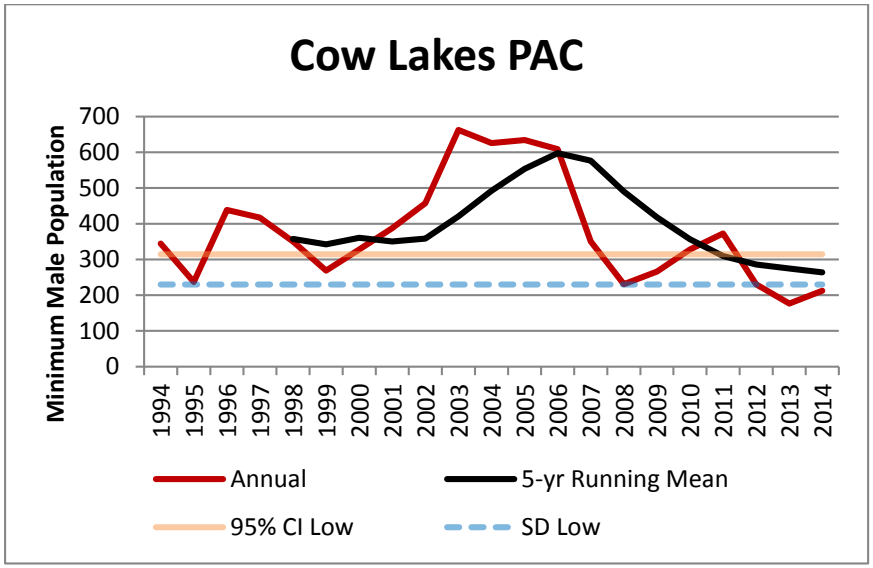
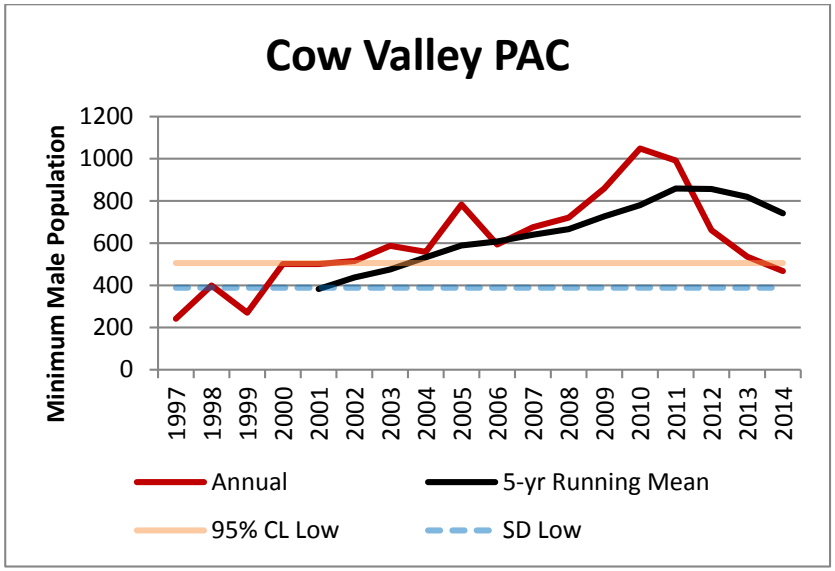
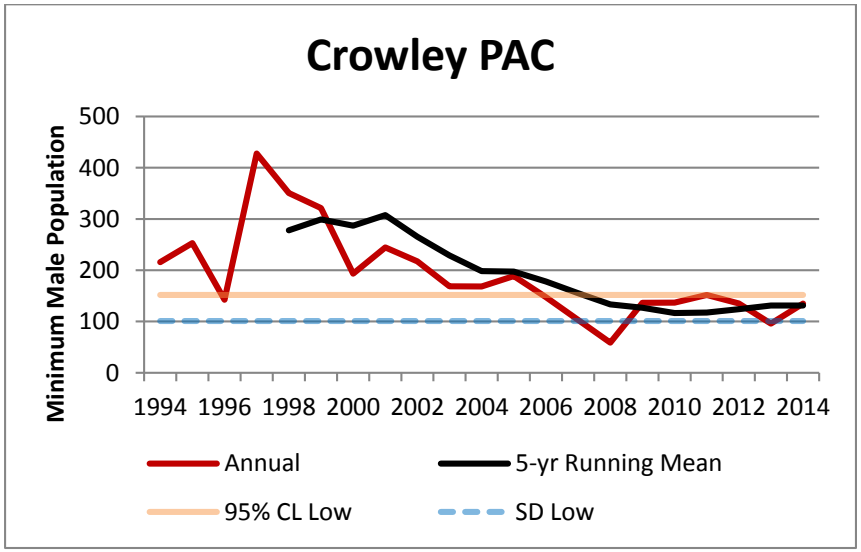


Figure D-1 Population Status of Each PAC Relative to the Soft and Hard Triggers *(continued)*







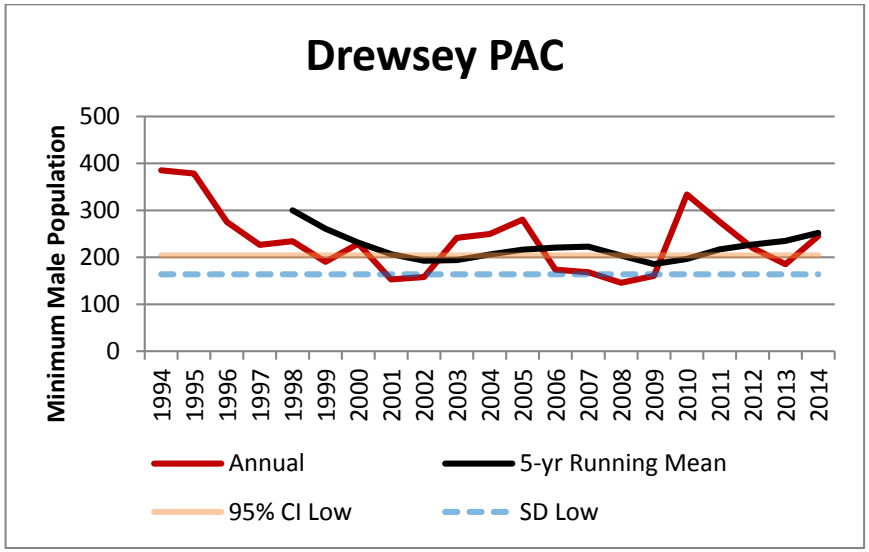
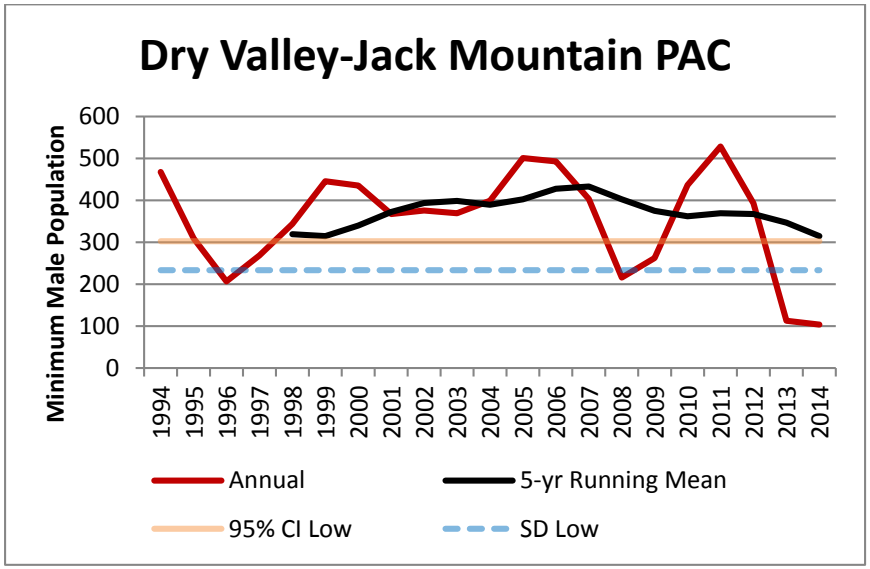
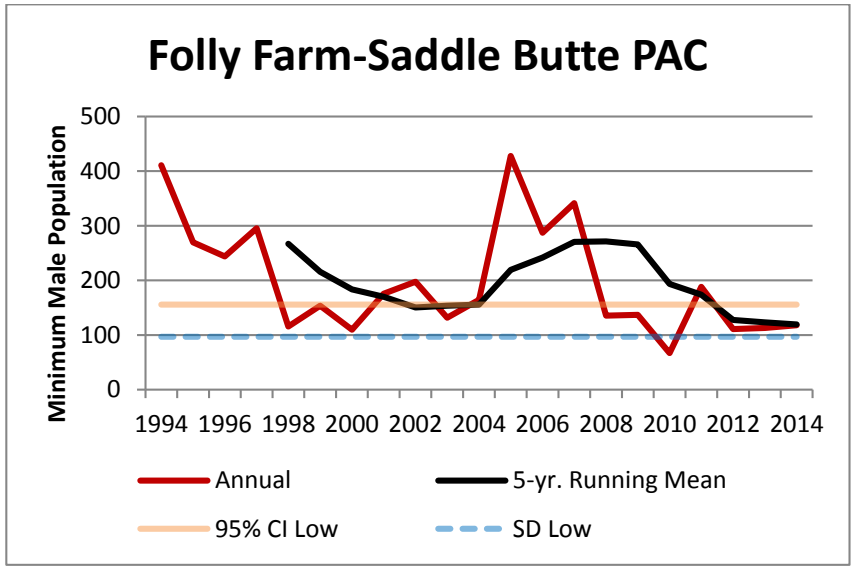
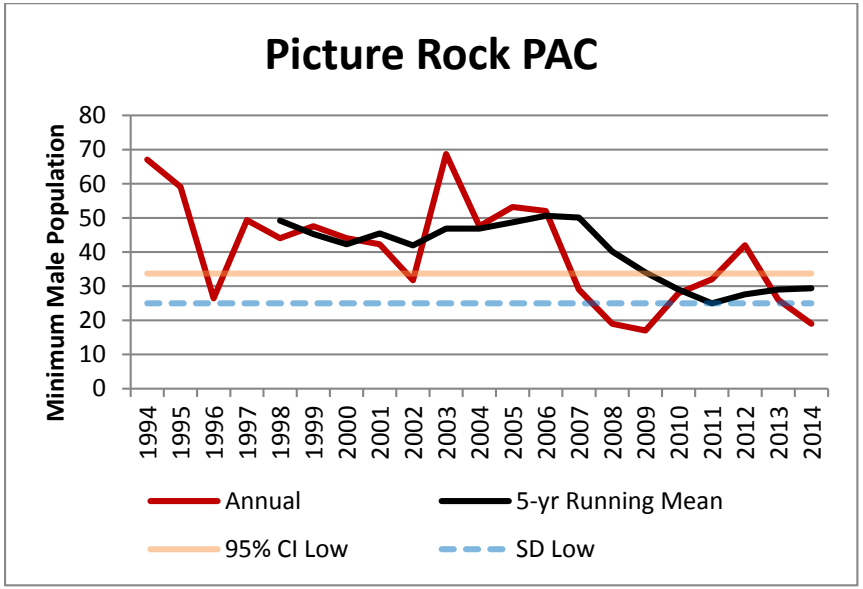


Figure D-1 Population Status of Each PAC Relative to the Soft and Hard Triggers *(continued)*







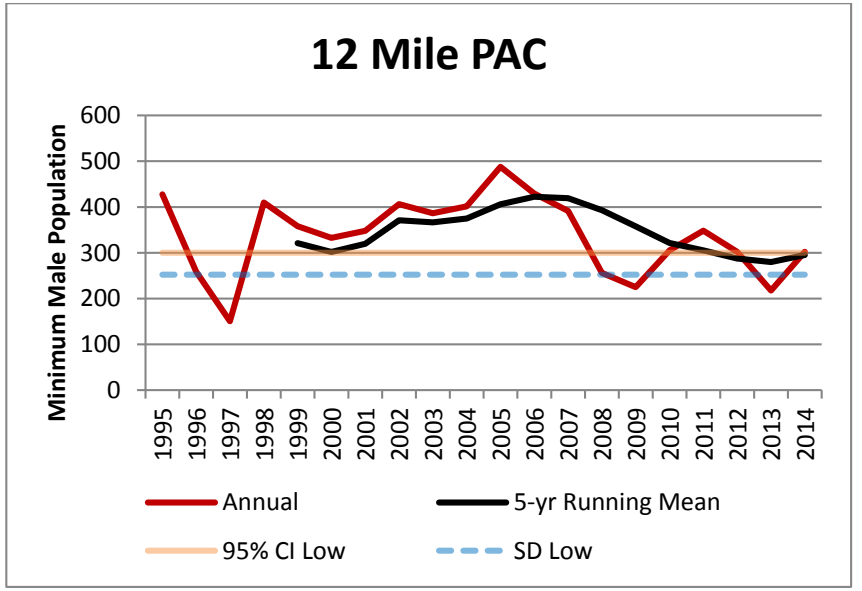
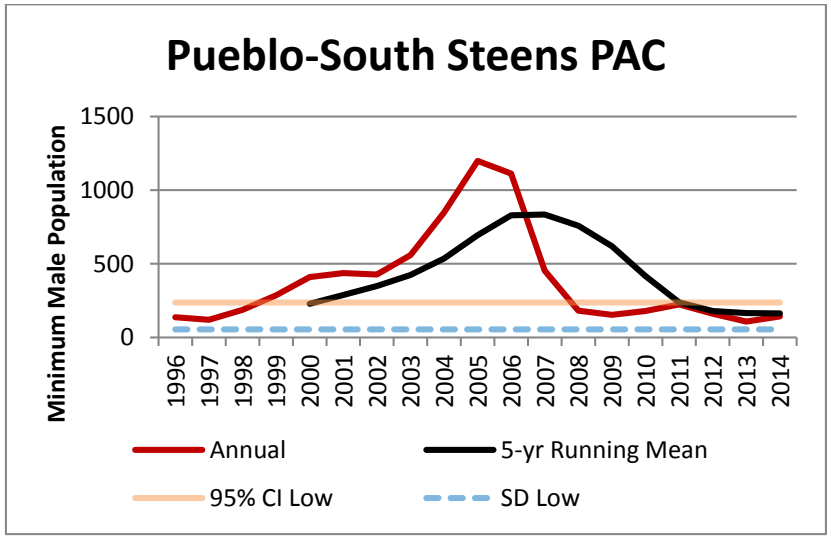
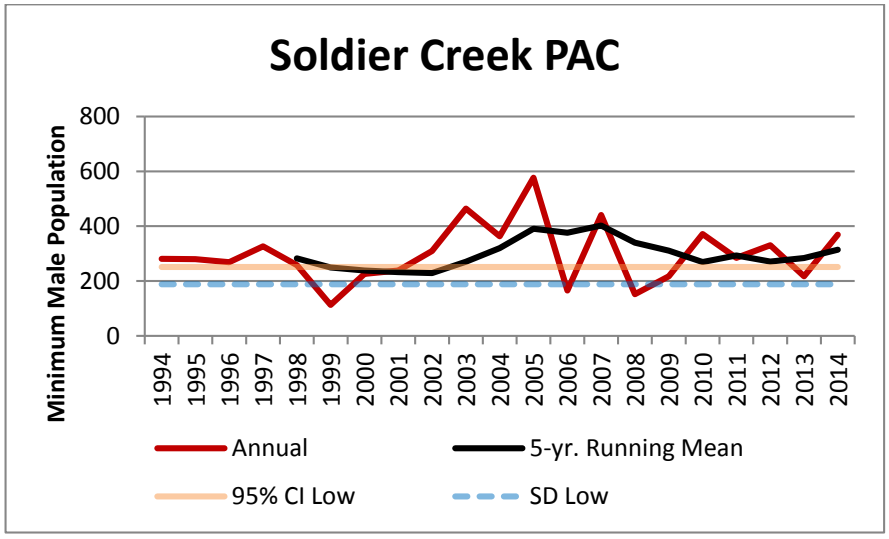
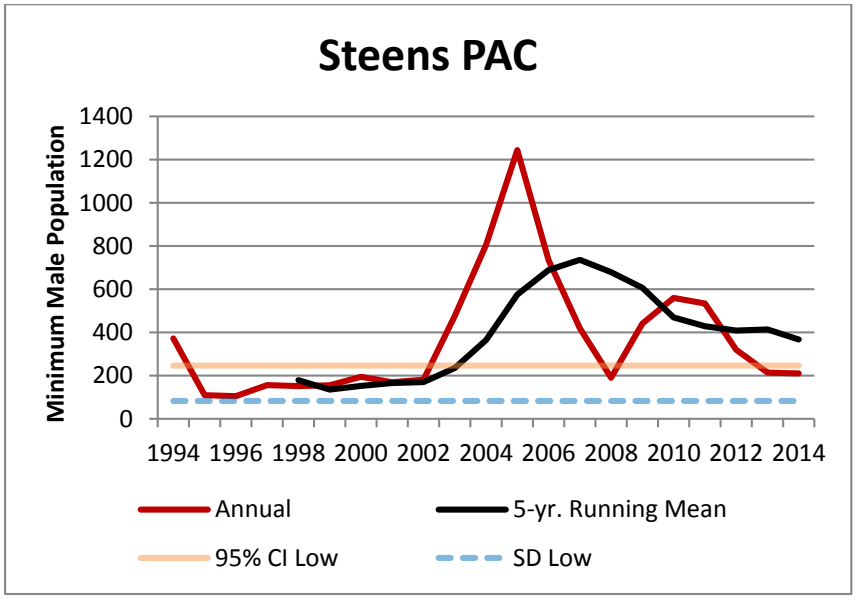


Figure D-1 Population Status of Each PAC Relative to the Soft and Hard Triggers *(continued)*







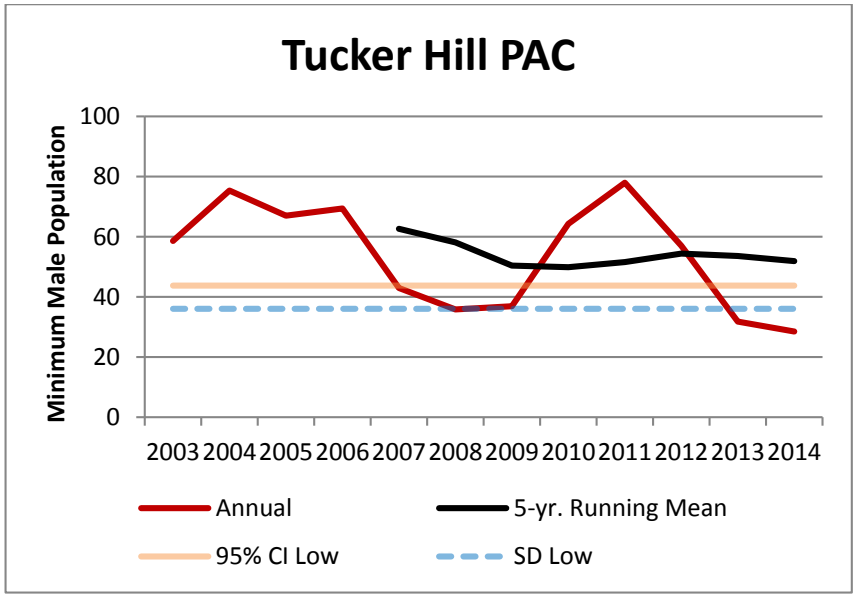
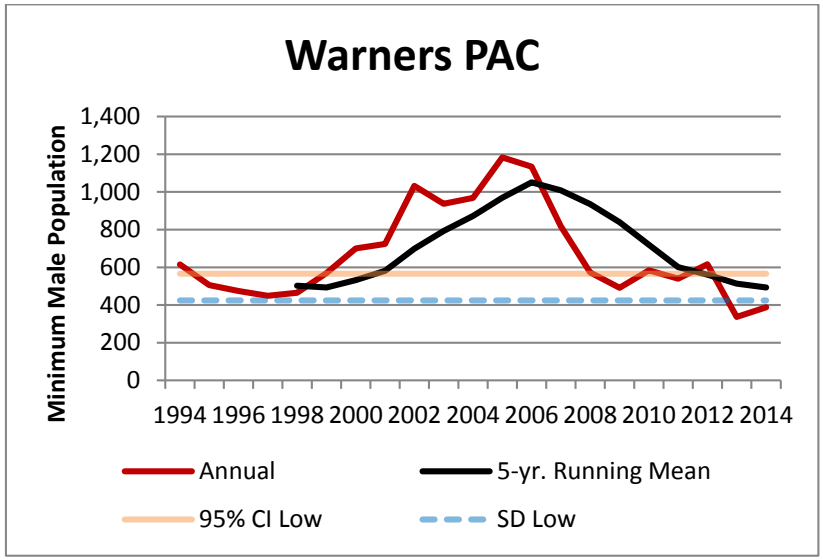
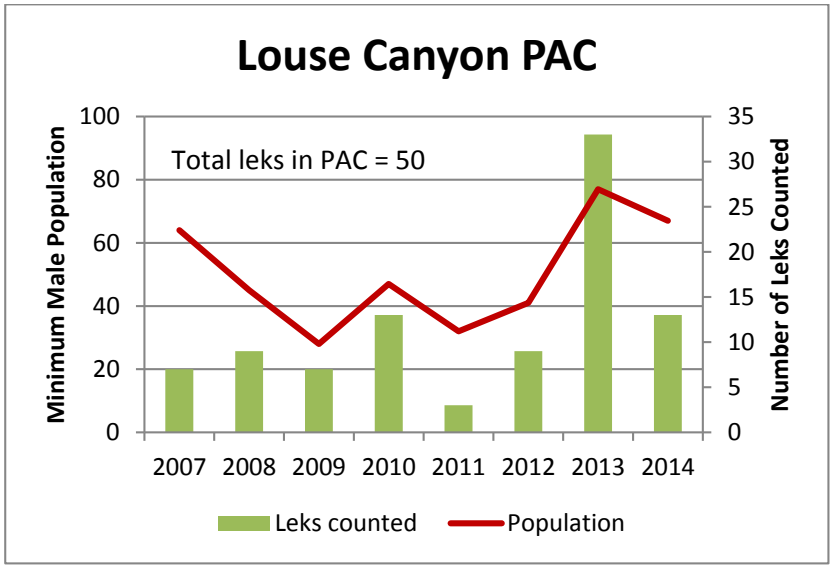
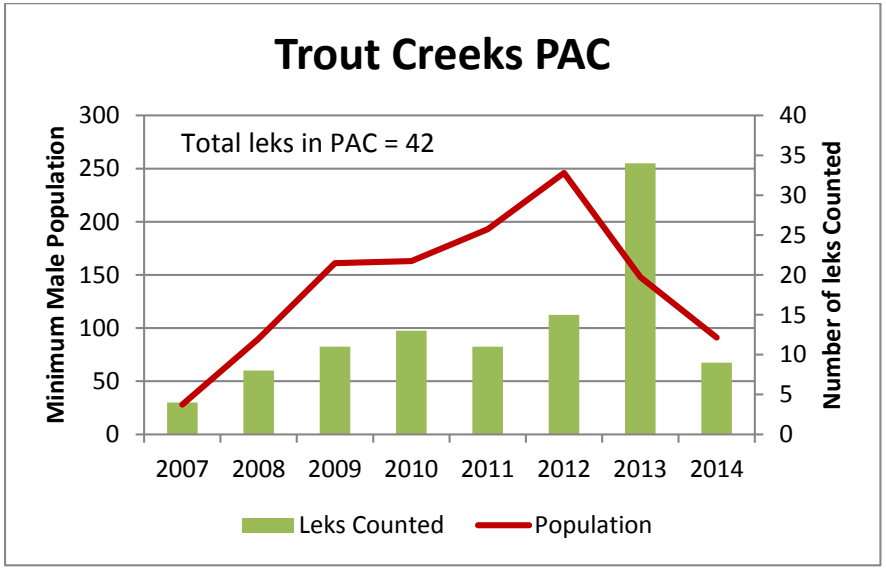


Figure D-1 Population Status of Each PAC Relative to the Soft and Hard Triggers *(continued)*







HABITAT TRIGGER DEVELOPMENT PROCESS

Understanding that there are natural minor fluctuations in sagebrush cover, the percent of sagebrush cover in the landscape serves as an indicator for GRSG habitat quality (Karl and Sadowski 2005; Hagen 2011). Short-term losses of sagebrush due to factors such as fire or insect defoliation are to be expected, recognizing that recovery rates vary considerably between the type and scale of disturbance and the specific ecological sites involved. However, sagebrush landscape cover ≤25 percent has a low probability of maintaining GRSG leks, while >65 percent sagebrush landscape cover has a high probability of sustaining GRSG populations (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013; Chambers et al. 2014b).

BLM developed habitat objectives for the plan based on the scientific information cited above (see Tables 2-2 and 2-3). The soft trigger indicates the level of landscape sagebrush cover that still provides some use by GRSG but does not meet the amount of cover indicated by scientific studies and recommended by the NTT report to sustain GRSG populations. The hard trigger indicates the level of landscape sagebrush cover that does not provide sufficient habitat to sustain GRSG populations over the long-term.

POPULATION TRIGGER DEVELOPMENT PROCESS

In order to set adaptive management soft and hard triggers for GRSG populations, BLM analyzed male GRSG population data provided by Oregon Department of Fish and Wildlife (ODFW) in Excel spreadsheets. The state uses counts of males at leks to estimate populations of both males and females (see Hagen 2011, Section III for details on state methods for estimating population based on lek counts). The data provided assigned leks and lek complexes to individual PACs as well as the statewide data. The initial data consisted of survey results conducted as far back as 1980. However because survey effort was much less, involving far fewer leks, and survey effort increased beginning in the mid-1990s, BLM discarded data prior to the mid-1990s, resulting in approximately 20 years of data for most PACs and on a statewide basis.

The state does not survey every lek every year due to limited resources and accessibility problems. The lack of roads in the largest PACs along Oregon's southern border with Nevada as well as sheer distance limits the state's ability to survey these areas in particular. Years with high snowpack or wet conditions during the mating period often limit the state's ability to reach more remote leks across the state. As a consequence, data are sparse, particularly for smaller PACs and more remote PACs. Before analyzing population trends, BLM used a similar process to what the state uses to fill in missing data, projecting forward and backward from actual counts.

For the purposes of this analysis, BLM defined a trend lek as one with no more than one year of missing data over the analysis period and identified trend leks for each PAC. This definition differs from the definition used by ODFW for a

trend lek (Hagen 2011, p. 14). Three PACs did not have any leks that met the BLM definition: Burns, Louse Canyon, and Trout Creeks. BLM did not conduct a population analysis or establish PAC-specific soft and hard population triggers for these PACs. Ten PACs had usable population data back to 1994 (21 years), four had usable data back to 1995 (20 years), Pueblos-South Steens PAC had usable data back to 1996 (19 years), Cow Valley PAC had population data back to 1997 (18 years), and Tucker Hill PAC had usable data back to 2003 (12 years).

To fill in missing data and allow population levels to fluctuate over time, BLM summed the observations for all trend leks in each PAC and calculated the interannual rate of change (lambda) for each PAC by dividing the total for the current year by the total for the previous year. BLM assumed that population change for the PAC as a whole followed the same pattern as in the trend leks. Rates of change varied between 0 and 3 using this method. A lambda of less than one indicates a population decline while a lambda greater than one indicates a population increase.

When an observation was a positive integer (1 or more), BLM projected backward by dividing the observation in the source cell by the lambda associated with the source cell year and projected forward by multiplying the observation in the source cell by the lambda associated with the destination cell year. For example, to project backward in 2000 from an observation in 2001, BLM divided the observation in 2001 by the lambda for 2001; to project forward to 2002, BLM multiplied the observation in 2001 by the lambda for 2002. Where two positive numbers bracketed a period of no surveys, BLM projected half the years backward and half the years forward. When this period involved an odd number of years, BLM alternated whether one more year was projected backward or forward. Where a positive number and zero bracketed a period of no surveys, BLM projected backward or forward from the positive number to the year with a zero. BLM could not make projections when the observation was zero males as multiplying by zero yields zero and dividing by zero is mathematically undefined. Thus, population estimates over time remain incomplete both statewide and in all PACs analyzed.

To deal with this remaining data gap, BLM followed a procedure used by ODFW for estimating total male GRSG population. BLM calculated the average male population over the most recent eight years and grouped leks/lek complexes based on estimated annual lek population size. Using ODFW definitions, BLM created between two and five strata per PAC:

- Inactive – average male population = 0
- Small – average male population = 0.01-10
- Medium – average male population = 11-25
- Large – average male population = 26-50

- Extra-large – average male population = 51+

BLM estimated the annual population for each stratum by averaging the population estimate in each year and multiplying that average by the number of lek/lek complexes in that stratum. BLM often did not estimate stratum population for inactive leks as all values were either "not surveyed" or zero. However, BLM did include the inactive stratum for PACs where the population earlier than the most recent eight years was largely positive. Most PAC had some leks/lek complexes where no surveys had occurred over the analysis period; these leks and lek complexes were not included in the estimate. BLM then summed the strata population estimate for each year. Both BLM and ODFW consider the resulting estimate to be a minimum male population estimate.

To set the soft and hard triggers for population, BLM estimated the average population over the analysis period for each PAC and calculated the standard deviation, 95% confidence interval of the average, and 5-year running mean. The 5-year running mean equals the average of the current year plus the previous four years. BLM used large drops in the annual population estimate as soft trigger criteria and the 5-year running mean population estimates in relation to the lower 95% confidence interval and the lower standard deviation values for both soft and hard trigger criteria. BLM established all triggers in consultation with ODFW and FWS. The State sage-grouse management strategy (Hagen 2011, p. 35) using a greater than 7 percent decline for three consecutive years in the statewide 5-year running mean. BLM used 10 percent since greater fluctuation in estimated populations should be expected at the smaller scale. At the statewide scale, decreases in some PACs are often partially offset by increases in other PACs.

PAC Name	Number of Leks/Lek Complexes	Number of Trend Leks	Effective Period of Record	Average Minimum Male Population	Lower 95th percentile Confidence Interval Value	Lower Standard Deviation Value
Baker	36	3	1995-2014	313	256	182
Beatys	74	2	1995-2014	1221	1048	825
Brothers/North Wagontire	19	9	1994-2014	174	156	132
Bully Creek	30	2	1995-2014	232	195	147
Burns	2	0	N/A	N/A	N/A	N/A
Cow Lakes	40	2	1994-2014	377	314	230
Cow Valley	38	2	1997-2014	606	506	388
Crowley	33	3	1994-2014	190	152	101
Drewsey	22	2	1994-2014	234	204	164
Dry Valley/Jack Mountain	20	6	1994-2014	354	302	233
Folly Farm/ Saddle Butte	17	1	1994-2014	200	156	97
Louse Canyon	50	0	2007-2014	N/A	N/A	N/A

PAC Name	Number of Leks/Lek Complexes	Number of Trend Leks	Effective Period of Record	Average Minimum Male Population	Lower 95th percentile Confidence Interval Value	Lower Standard Deviation Value
12 Mile	36	1	1995-2014	337	300	252
Picture Rock	5	2	1994-2014	40	34	25
Pueblos/South Steens	20	2	1996-2014	386	237	54
Solider Creek	30	4	1994-2014	298	251	188
Steens	10	3	1994-2014	368	246	82
Trout Creeks	42	0	2007-2014	N/A	N/A	N/A
Tucker Hill	5	1	2003-2014	54	44	36
Warners	46	4	1994-2014	672	566	424

	Habitat		Population		Both Soft Triggers
PAC Name	Soft Trigger	Hard Trigger	Soft Trigger	Hard Trigger	
Baker	No	No	Yes (5-yr Mean)	No	No
Beatys	No	No	No	No	No
Brothers/North Wagontire	No	No	No	No	No
Bully Creek	No	No	No	No	No
Burns	No	No	N/A	No	No
Cow Lakes	Yes	No	Yes (5-yr Mean)	No	Yes
Cow Valley	No	No	Yes (Annual)	No	No
Crowley	No	No	Yes (5-yr Mean)	No	No
Drewsey	No	No	No	No	No
Dry Valley/Jack Mountain	No	No	No	No	No
Folly Farm/ Saddle Butte	No[4]	No	Yes (5-yr Mean)	No	No
Louse Canyon	No	No	No	No	No
12 Mile	No	No	Yes (5-yr Mean)	No	No
Picture Rock	No	No	Yes (5-yr Mean)	No	No
Pueblos/South Steens	No	No	Yes (5-yr Mean)	No	No
Solider Creek	No	No	No	No	No
Steens	Yes	No	No	No	No
Trout Creeks	Yes	No	No	Yes	Yes
Tucker Hill	No	No	Yes (Annual)	No	No
Warners	No	No	Yes (5-yr Mean)	No	No

[4] Does not include potential impact of Buzzard Complex of fires from 2014

Appendix E
Mitigation

APPENDIX E
MITIGATION

GENERAL

In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g. avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM management actions and authorized third party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e. residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation (see glossary).

The BLM, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for BLM management actions and third party actions that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to greater sage-grouse habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to greater sage-grouse and its habitat.

The BLM's Regional Mitigation Manual MS-1794 serves as a framework for developing and implementing a Regional Mitigation Strategy. The following sections provide additional guidance specific to the development and implementation of a WAFWA Management Zone Regional Mitigation Strategy.

DEVELOPING A WAFWA MANAGEMENT ZONE REGIONAL MITIGATION STRATEGY

The BLM, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy to guide the application of the mitigation hierarchy for BLM management actions and third party actions that result in habitat loss and degradation. The Strategy should consider any State-level greater sage-grouse mitigation guidance that is consistent with the requirements identified in this Appendix. The Regional Mitigation Strategy should be developed in a transparent manner, based on the best science available and standardized metrics.

As described in Chapter 2, the BLM will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of greater sage-grouse, within 90 days of the issuance of the Record of Decision. The Strategy will be developed within one year of the issuance of the Record of Decision. BLM Oregon will ensure that coordination within with ODFW, USFWS, NRCS, and local government occurs through participation in the State of Oregon's consistency review or similar process. This will occur prior to participation at the Team level to facilitate a coordinated proposal from Oregon to the Team.

The Regional Mitigation Strategy should include mitigation guidance on avoidance, minimization, and compensation, as follows:

- Avoidance
  - Include avoidance areas (e.g. right-of-way avoidance/exclusion areas, no surface occupancy areas) already included in laws, regulations, policies, and/or land use plans (e.g. Resource Management Plans or State Plans); and,
  - Include any potential, additional avoidance actions (e.g. additional avoidance best management practices) with regard to greater sage-grouse conservation.
- Minimization
  - Include minimization actions (e.g. required design features, best management practices) already included in laws, regulations, policies, land use plans, and/or land-use authorizations; and,
  - Include any potential, additional minimization actions (e.g. additional minimization best management practices) with regard to greater sage-grouse conservation.

- Compensation
  - Include discussion of impact/project valuation, compensatory mitigation options, siting, compensatory project types and costs, monitoring, reporting, and program administration. Each of these topics is discussed in more detail below.
    - Residual Impact and Compensatory Mitigation Project Valuation Guidance
      - A common standardized method should be identified for estimating the value of the residual impacts and value of the compensatory mitigation projects, including accounting for any uncertainty associated with the effectiveness of the projects.
      - This method should consider the quality of habitat, scarcity of the habitat, and the size of the impact/project.
      - For compensatory mitigation projects, consideration of durability (see glossary), timeliness (see glossary), and the potential for failure (e.g. uncertainty associated with effectiveness) may require an upward adjustment of the valuation.
      - The resultant compensatory mitigation project will, after application of the above guidance, result in proactive conservation measures for Greater Sage-grouse (consistent with BLM Manual 6840 – Special Status Species Management, section .02).
    - Compensatory Mitigation Options
      - Options for implementing compensatory mitigation should be identified, such as:
        - Utilizing certified mitigation/conservation bank or credit exchanges.
        - Contributing to an existing mitigation/conservation fund.
        - Authorized-user conducted mitigation projects.
      - For any compensatory mitigation project, the investment must be additional (i.e. additionality: the conservation benefits of compensatory

mitigation are demonstrably new and would not have resulted without the compensatory mitigation project).

- Compensatory Mitigation Siting
  - Sites should be in areas that have the potential to yield a net conservation gain to the greater sage-grouse, regardless of land ownership.
  - Sites should be durable (see glossary).
  - Sites identified by existing plans and strategies (e.g. fire restoration plans, invasive species strategies, healthy land focal areas) should be considered, if those sites have the potential to yield a net conservation gain to greater sage-grouse and are durable.
- Compensatory Mitigation Project Types and Costs
  - Project types should be identified that help reduce threats to greater sage-grouse (e.g. protection, conservation, and restoration projects).
  - Each project type should have a goal and measurable objectives.
  - Each project type should have associated monitoring and maintenance requirements, for the duration of the impact.
  - To inform contributions to a mitigation/conservation fund, expected costs for these project types (and their monitoring and maintenance), within the WAFWA Management Zone, should be identified.
- Compensatory Mitigation Compliance and Monitoring
  - Mitigation projects should be inspected to ensure they are implemented as designed, and if not, there should be methods to enforce compliance.
  - Mitigation projects should be monitored to ensure that the goals and objectives are met and that the benefits are effective for the duration of the impact.

- Compensatory Mitigation Reporting
  - Standardized, transparent, scalable, and scientifically-defensible reporting requirements should be identified for mitigation projects.
  - Reports should be compiled, summarized, and reviewed in the WAFWA Management Zone in order to determine if greater sage-grouse conservation has been achieved and/or to support adaptive management recommendations.
- Compensatory Mitigation Program Implementation Guidelines
  - Guidelines for implementing the State-level compensatory mitigation program should include holding and applying compensatory mitigation funds, operating a transparent and credible accounting system, certifying mitigation credits, and managing reporting requirements.

INCORPORATING THE REGIONAL MITIGATION STRATEGY INTO NEPA ANALYSES

The BLM will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM management actions and third party actions that result in habitat loss and degradation and the appropriate mitigation actions will be carried forward into the decision.

IMPLEMENTING A COMPENSATORY MITIGATION PROGRAM

The BLM needs to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be managed at a State-level (as opposed to a WAFWA Management Zone or a Field Office), in collaboration with our partners (e.g. Federal, Tribal, and State agencies).

To ensure transparent and effective management of the compensatory mitigation funds, the BLM will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the Record of Decision. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM will remain responsible for making decisions that affect Federal lands.

OREGON SUB-REGION MITIGATION PROCEDURES

Introduction

The steps below identify a sequential screening process for review of proposed anthropogenic activities. This process applies to all BLM authorizations including those proposed by applicants, as well as BLM originated proposals. The goal of the process is to provide a consistent approach regardless of the administrative location of the project and to ensure that authorization of these projects will not contribute to the decline of GRSG.

Step 1

For applicant proposals: the screening process is initiated upon formal submittal of a proposal for authorization for use of BLM-administered lands. The actual documentation would include, at a minimum, a description of the location, size of the project, and timing of the disturbance and would be consistent with existing protocol and procedures for the specific type of use. BLM anticipates that third parties (e.g. rural electric cooperatives) would be submitting the proposals.

For BLM proposals: the screening process would be incorporated into the NEPA analysis for the proposal.

Step 2

Evaluate whether the proposal could be allowed as prescribed in the applicable RMP. For example, certain activities are prohibited in PHMA such as wind or solar energy development. If the proposal is an activity that is specifically prohibited, inform the submitter that the proposal is rejected since it is not consistent with the applicable RMP, regardless of the project design.

In addition to consistency with program allocations, the GRSG RMP amendment identifies a limit on the amount of new discretionary disturbance that is allowed within an Oregon Priority Area for Conservation (Oregon PAC). If current disturbance within the affected unit exceeds this threshold, the project would be deferred until the amount of disturbance within the area has been reduced to the identified level. Similarly, if a population or habitat adaptive management trigger is reached; the proposed project may be deferred.

Step 3

Determine if the project would have a direct or indirect impact on population or habitat (regardless of ownership). This can be done by:

1. Reviewing habitat maps.
2. Reviewing the Summary of science, activities, programs, and policies that influence the rangewide conservation of Greater Sage-Grouse (Manier, 2013) which identifies the area of direct and indirect effects for various anthropogenic activities.

3. Consultation with, USFWS, or State Agency wildlife biologist.
4. Reviewing the decisions in the plan amendments (such as required design features for the proposed activity).
5. Other methods acceptable to the BLM/authorized officer.

If the proposal will not have a direct or indirect impact on either the habitat or population, proceed with the appropriate process for review, decision, and implementation of the project.

Step 4

If the project could have a direct or indirect impact to sage-grouse habitat or population, evaluate whether the proposal can be relocated to not have the impact and still achieve the intent of the proposal. If the project can be relocated so as to not have an impact on sage-grouse and still achieve objectives of the proposal, inform applicant and proceed with the appropriate process for review, decision, and implementation of the relocated project.

Step 5

For applicant proposals: If the preliminary review of the proposal concludes that there may be impacts to sage-grouse habitat and/or population, and the project cannot be effectively relocated to eliminate these impacts; evaluate whether the agency has the authority to modify or deny the project. If the agency does NOT have the discretionary authority to modify or deny the proposal, proceed with the authorization process (decision) and include appropriate mitigation requirements that minimize impacts to sage-grouse habitat and populations. Mitigation (to achieve a net conservation gain to sage-grouse) would be the financial responsibility of the applicant and could include a combination of actions such as timing of disturbance, design modifications of the proposal, site disturbance restoration, and compensatory mitigation actions.

Step 6

If this is a BLM originated proposal or the agency has the discretionary authority to deny the applicant proposed project and after careful screening of the proposal (Steps 1-4) has determined that direct and indirect cannot be eliminated, evaluate the proposal to determine if the adverse impacts can be mitigated with a net conservation gain. If the impacts cannot be effectively mitigated to a net conservation gain, select the no action alternative for BLM proposals; for applicant proposals, reject or defer the proposal. The criteria for determining this situation would include but are not limited to:

- Disturbance within the Oregon PAC is substantial and allowing additional activities within the area would adversely impact the species (See habitat and population triggers in the adaptive management strategy).

- The population or habitat trend within the Oregon PAC is down and allowing additional impacts, whether mitigated or not, could lead to further decline of the species or habitat (See habitat and population triggers in the adaptive management strategy).
- Monitoring or current research indicates the proposed mitigation is ineffective, insufficient, or unproven.
- The additional impacts, after applying effective mitigation, would exceed the disturbance threshold for the Oregon PAC.
- The project would impact habitat that has been determined, through monitoring, to be a limiting factor for species sustainability within the Oregon PAC.
- Other site-specific criteria that determined the project would lead to a downward trend to the current species population or habitat with the Oregon PAC.

If the project can be mitigated to provide for a net conservation gain to the species, as determined through coordination with ODFW and FWS, proceed with the design of the mitigation plan and authorization (through NEPA analysis and decision) of the project. The authorization process could identify issues that may require additional mitigation or denial/deferring of the project based on site specific impacts to the Greater Sage-grouse.

GLOSSARY TERMS

Additionality: The conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project. (adopted and modified from BLM Manual Section 1794).

Avoidance mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action. (40 CFR 1508.20(a)) (e.g. may also include avoiding the impact by moving the proposed action to a different time or location.)

Compensatory mitigation: Compensating for the (residual) impact by replacing or providing substitute resources or environments. (40 CFR 1508.20)

Compensatory mitigation projects: The restoration, creation, enhancement, and/or preservation of impacted resources (adopted and modified from 33 CFR 332), such as on-the-ground actions to improve and/or protect habitats (e.g. chemical vegetation treatments, land acquisitions, conservation easements). (adopted and modified from BLM Manual Section 1794).

Compensatory mitigation sites: The durable areas where compensatory mitigation projects will occur. (adopted and modified from BLM Manual Section 1794).

Durability (protective and ecological): The maintenance of the effectiveness of a mitigation site and project for the duration of the associated impacts, which includes resource, administrative/legal, and financial considerations. (adopted and modified from BLM Manual Section 1794).

Minimization mitigation: Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (40 CFR 1508.20 (b))

Residual impacts: Impacts that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Timeliness: The lack of a time lag between impacts and the achievement of compensatory mitigation goals and objectives (BLM Manual Section 1794).

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Appendix F

Fluid Mineral Leasing Stipulations

APPENDIX F
FLUID MINERAL LEASING STIPULATIONS

This appendix lists by alternative surface stipulations for geothermal and oil and gas leasing referred to throughout this Resource Management Plan Amendment (RMPA) and Environmental Impact Statement (EIS). These surface stipulations would also apply, where appropriate and practical, to other surface-disturbing activities (and occupancy) associated with land use authorizations, permits, and leases issued on BLM-administered lands. The stipulations would not apply to other activities and uses where they are contrary to laws, regulations, or policy for specific land use authorizations. The intent is to manage other activities and uses as consistently as possible with geothermal and oil and gas leasing.

Surface-disturbing activities are those that normally result in more than negligible disturbance to public lands. These activities normally involve disturbance to soils and vegetation to the extent that reclamation is required. They include, but are not limited to, the use of mechanized earth-moving equipment; truck-mounted drilling equipment; geophysical exploration; off-road vehicle travel in areas designated as limited or closed to off-highway vehicle (OHV) use; placement of surface facilities such as utilities, pipelines, structures, and oil and gas wells; new road construction; and use of pyrotechnics, explosives, and hazardous chemicals. Surface-disturbing activities would not include livestock grazing, cross-country hiking, driving on designated routes, and minimum impact filming permits.

DESCRIPTION OF SURFACE STIPULATIONS

Table F-1 shows the stipulations for the alternatives, including exceptions, modifications, and waivers. Three surface stipulations could be applied to land use authorizations: (1) no surface occupancy (NSO), (2) timing limitations (TL), and (3) controlled surface use (CSU). There are no stipulations included for Alternatives C and F because they are closed to all geothermal and oil and gas activities within occupied habitat. All stipulations for other resources, besides GRSG, included in the existing land use plans would still be applicable.

Areas identified as NSO would be closed to surface-disturbing activities for fluid minerals.

Areas identified as TL would be closed to surface-disturbing activities during identified time frames. TL areas would be open to operational and maintenance activities, including associated vehicle travel, during the closed period unless otherwise specified in the stipulation.

Areas identified as CSU would require proposals to be authorized only according to the controls or constraints specified. The controls would be applicable to all surface-disturbing activities.

EXCEPTIONS, MODIFICATIONS, AND WAIVERS

Surface stipulations could be excepted, modified, or waived by the Authorized Officer. An exception exempts the holder of the land use authorization document from the stipulation on a one-time basis. A modification changes the language or provisions of a surface stipulation, either temporarily or permanently. A waiver permanently exempts the surface stipulation. The environmental analysis document prepared for site-specific proposals such as geothermal and oil and gas development (i.e., applications for permit to drill [APD] or sundry notices) also would need to address proposals to exempt, modify, or waive a surface stipulation. To exempt, modify, or waive a stipulation, the environmental analysis document would have to show that (1) the circumstances or relative resource values in the area had changed following issuance of the lease, (2) less restrictive requirements could be developed to protect the resource of concern, and (3) operations could be conducted without causing unacceptable impacts.

STANDARD TERMS AND CONDITIONS

All surface-disturbing activities are subject to standard terms and conditions. These include the stipulations that are required for proposed actions in order to comply with the Endangered Species Act (ESA). Standard terms and conditions for geothermal and oil and gas leasing provide for relocation of proposed operations up to 200 meters and for prohibiting surface-disturbing operations for a period not to exceed 60 days. The stipulations addressed in **Table F-1** that are within the parameters of 200 meters and 60 days are considered open to geothermal and oil and gas leasing subject to standard terms and conditions.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
Alternative A	
No surface occupancy within 0.6 mile of known sage-grouse lek sites. Upper Deschutes RMP	**Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates the proposed action will not affect sage-grouse or the lek site. **Modification:** The boundaries of the stipulated area may be modified if the authorized officer determines that a portion of the area can be occupied without adversely affecting sage-grouse or the lek site. **Waiver:** This stipulation may be waived if the authorized officer determines that there is no longer a lek site on the leasehold.
Leasable minerals will continue to be made available, [but with] seasonal restrictions on sage-grouse strutting grounds Brothers/La Pine RMP	**Exception:** No exceptions. **Modification:** No modifications. **Waiver:** No waivers.
Baker RMP (1996)–No specific sage-grouse stipulations. Standard stipulations and notices where not otherwise noted.	**Exception:** Stipulation specific. **Modification:** Stipulation specific. **Waiver:** Stipulation specific.
No surface occupancy (NSO) is allowed within 0.6 mile of sage-grouse leks between March 1 and June 1 of each year for leasable minerals. Andrews Management Unit RMP	**Exception:** No exceptions. **Modification:** Allowed if lek is no longer used by sage-grouse. **Waiver:** Allowed if lek is no longer used by sage-grouse.
Allow no sagebrush removal within 2 miles of sage-grouse strutting grounds when determined by a wildlife biologist to be detrimental to sage-grouse habitat requirements. Three Rivers RMP	**Exception:** The authorized officer can grant an exception to a specific activity if field inspection shows that grouse are not using the area and the proposed activities would not significantly degrade the habitat. An exception may be granted for operations conducted on existing roads with a high volume of traffic. **Modification:** A portion of the leased lands can be open to activity if field inspection shows that grouse are not using the area and the proposed activity would not significantly degrade the habitat. This stipulation can be expanded to cover additional portions of the lease if additional leks, habitat, or winter range areas are identified. **Waiver:** This stipulation can be waived when the available data show that the portion of the lease under the restriction no longer provides suitable habitat and grouse no longer use the area.
Timing limitation–This stipulation is applied to land where the resource values (such as raptor nesting, sage-	**Exception:** No exceptions. **Modification:** No modifications. **Waiver:** No waivers.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
grouse leks, or big game winter range) cannot be adequately protected by the standard lease terms, but yet do not require a yearlong restriction on leasing operations. Less restrictive stipulations (such as controlled surface use or standard stipulations) were considered in developing this stipulation, but it was concluded that they would not afford sufficient protection to the known and suspected resources found on the parcel(s). SE Oregon RMP	
There will also be areas where a seasonal or other special stipulation will be applied to protect values identified. These areas include some ACECs (Table 13, OWS); a 0.5-mile buffer around sage-grouse leks; big game winter ranges; areas of special status plant and animal species and their essential habitat; and RCAs. SE Oregon RMP	**Exception:** No exceptions. **Modification:** No modifications. **Waiver:** No waivers.
Sage-grouse breeding activity could be disrupted by lease activity during the strutting season. An NSO stipulation will be applied within 0.5 mile of these sites between March 1 and June 1 of each year. The authorized officer may modify the size and timeframes of the stipulation if monitoring indicates that current sage-grouse use patterns are inconsistent with dates established for animal occupation, or if the proposed action could be conditioned so as to not interfere with sage-grouse strutting. SE Oregon RMP	**Exception:** The authorized officer may grant an exception to the stipulation if site-specific environmental analysis indicates that an action would not interfere with sage-grouse strutting. **Modification:** The authorized officer may modify the size and timeframes of the stipulation if monitoring indicates that current sage-grouse use patterns are inconsistent with dates established for animal occupation, or if the proposed action could be conditioned so as to not interfere with sage-grouse strutting. **Waiver:** This stipulation may be waived by the authorized officer if monitoring determines that all or specific portions of the lease area no longer satisfy this functional capacity.
Alternative B	
Not applicable	PHMAs are closed to fluid mineral leasing

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
Same as Alternative A	GHMAs are open to fluid mineral leasing
Alternative C	
Not applicable	PHMAs and GHMAs are closed to fluid mineral leasing
Priority Habitat – Alternative D (Oregon Alternative)	
No surface occupancy in occupied habitat within 4 miles of a lek located within PHMA.	**Purpose:** To protect occupied GRSG leks and associated seasonal habitat, life-history, or behavioral needs of GRSG in proximity to leks, from habitat fragmentation and loss and GRSG populations from disturbance inside priority habitat areas and connectivity habitat areas. **Exception:** Within the mapped priority habitat there may be areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, pine/juniper ecological sites, or towns. These areas of non-habitat would be identified during site-specific project review by agency biologists, in discussion with ODFW and other agencies, as appropriate. Decisions associated with priority or general habitat would apply to areas with or ecologically capable of supporting GRSG habitat. The decisions may be excepted if it can be shown that the action would occur in a non-habitat area and the following conditions are met: • Access through GRSG habitat to the activity in the non-habitat area occurs only on existing routes, and no new roads, maintenance, or improvements to roads would be required within GRSG habitat, no activity would be permitted or authorized if it would establish a valid existing right that would subsequently require construction of new routes within GRSG habitat for access; • Access to the activity for construction, maintenance, etc. would be required to avoid applicable GRSG sensitive seasons (i.e., breeding, brood-rearing, winter) and time periods (from 2 hours before to 2 hours after sunrise and sunset near leks during breeding season); • The non-habitat does not provide important connectivity between habitats; • Impacts to adjacent priority habitat areas can be reduced or eliminated (e.g., sound, tall structures). **Modification:** None. **Waiver:** A waiver may be granted if the lek is determined to be completely abandoned, destroyed, or occurs outside the initial identified area, as determined by the BLM and ODFW.
PHMA beyond 4 miles of an occupied lek, if the lek is located	See below for Exceptions, Waivers, and Modifications per habitat.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
within priority habitat, would be designated as open to oil and gas leasing subject to controlled surface use stipulations (see list below) and the following timing stipulations: • Winter habitat from November 1 – February 28 • Breeding and nesting habitat from March 1 – June 30 • Late brood rearing habitat from July 1 – October 31 – The development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season); – The development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography); – Operators must submit a site-specific plan of development for roads, wells, pipelines, and other infrastructure prior to any development being authorized; this plan should outline how	

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
development on the lease will limit habitat fragmentation; and – The development does not exceed the 3% disturbance limit.	
PHMA beyond 4-mile NSO-**Winter Habitat TL** No surface disturbance allowed between November 1 – February 28, in winter habitat.	**Purpose:** To seasonally protect GRSG winter habitat areas from disruptive activities within priority habitat areas. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** The Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include winter habitat (lacking the principle habitat components of winter GRSG habitat) or are outside the current defined winter GRSG areas, as determined by the BLM/FS in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area. **Waiver:** None.
PHMA beyond 4-mile NSO-**Brood-rearing Habitat TL** No surface disturbance allowed between July 1 – October 31, in GRSG brood-rearing habitat.	**Purpose:** To seasonally protect brood-rearing GRSG habitat from disruptive activity. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine that the lek is not active that year (based on ODFW lek survey protocol); • If surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	Modification: The Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include brood-rearing habitat (lacking the principle habitat components of brood-rearing GRSG habitat) or are outside the current defined brood-rearing GRSG areas, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area. **Waiver:** None.
PHMA beyond 4-mile NSO-**Breeding and Nesting Habitat TL** No surface disturbance allowed between March 1 – June 30, within breeding and nesting habitat (4-miles of a lek).	**Purpose:** To seasonally protect breeding and nesting GRSG habitat from disruptive activity in priority habitat areas. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine that the lek is not active that year (based on ODFW lek survey protocol), and the proposed activity will not take place beyond the season being excepted; • If surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** The Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include breeding and nesting habitat (lacking the principle habitat components of breeding and nesting GRSG habitat) or are outside the current defined area (therefore activity must be outside of the 4-mile lek buffer in PHMA), as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
Surface occupancy or use within the 4-mile buffer of a lek outside of PHMA is subject to the following operating constraints: • The development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season); and • The development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography).	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG of the lek from habitat loss and populations from disturbance outside of PHMA. **Exception:** None. **Modification:** None. **Waiver:** A waiver may be granted if the lek is determined to be unoccupied as determined by ODFW.
Surface occupancy or use in occupied habitat is subject to the following operating constraints: • The development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season); and • The development meets tall structure restrictions (a tall structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance in PHMA. **Exception:** None. **Modification:** None. **Waiver:** None.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography).	
Operators must submit a site-specific plan of development for roads, wells, pipelines, and other infrastructure prior to any development being authorized; this plan should outline how development on the lease will limit habitat fragmentation before surface occupancy or use is allowed in habitat.	**Purpose:** To protect PHMA and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance and limit fragmentation in PHMA. **Exception:** None. **Modification:** None. **Waiver:** None.
Surface occupancy or use is not allowed within PHMA unless the area has not exceeded the 3% disturbance limit.	**Purpose:** To protect PHMA and the life-history needs of GRSG from habitat loss and GRSG populations from disturbance and limit fragmentation in PHMA. **Exception:** Combined localized disturbance may exceed 3% if discrete disturbances are consolidated and localized and it is shown through an environmental compliance document that the total areas within the discrete disturbances does not exceed 3% in the identified disturbance calculation area and that the consolidation of disturbance in the area would be beneficial to the GRSG population. This could result in localized areas where existing and proposed disturbances exceed 3%, but total disturbances in the identified disturbance calculation area equals or is less than 3%. **Modification:** None. **Waiver:** None.
Surface occupancy or use is subject to the following special operating constraints: • Development is required to incorporate all design features identified in Appendix D (of the NTT Report).	**Purpose:** To protect occupied GRSG habitat and the life-history needs of GRSG from habitat loss and fragmentation and to limit GRSG habitat disturbance. **Exception:** An exception to this stipulation could be granted by the Authorized Officer unless one of the following is demonstrated through an environmental compliance document associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity;

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	• A proposed design feature or best management practice is determined to provide equal or better protection for GRSG or its habitat; • Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed. **Modification:** None. **Waiver:** None.
General Habitat – Alternative D (Oregon Alternative)	
No surface disturbance within one mile of an occupied and pending lek located within GHMA. This stipulation applies whether or not the area is within GRSG habitat.	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG in proximity of the lek from habitat loss and GRSG populations from disturbance inside and out of GHMA. **Exception:** The Authorized Officer may grant an exception in coordination with ODFW during project implementation and if best management practices (e.g., anti-perch devices for raptors, etc.) are implemented. **Modification:** None. **Waiver:** Application of the above use restrictions and meeting objectives within general habitat may be waived by the Field Manager if off-site mitigation is successfully completed in priority habitat or opportunity areas, following discussion with BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.
General habitat beyond 1 mile of an occupied lek, if the lek is within general habitat, would be designated as open to oil and gas leasing subject to CSU stipulations and the following timing stipulations: • Winter habitat from November 1 to Febuary 28 • Breeding and nesting habitat from March 1 to June 30 • Brood rearing habitat from July 1- October 31 Where leasing/development is allowed within general habitat, development could occur only if it adheres to the following controlled surface use stipulations:	See Exceptions, Modifications, and Waivers below.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
• The development meets noise restrictions (noise at occupied lek less than 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season). • The development meets tall structure restrictions (e.g., the human-made structure is not visible from the edge of the lek; determination of tall structure would be based on local conditions such as vegetation or topography). • Operators must submit a site-specific plan of development for roads, wells, pipelines, and other infrastructure prior to any development being authorized; this plan should outline how development on the lease will limit habitat fragmentation; General habitat within and beyond the 1 mile NSO area would require coordination with ODFW during project implementation and implementation of BMPs.	
GH- Beyond 1 mile NSO-**Winter Habitat TL**-No surface disturbance allowed between November 1 – February 28.	**Purpose:** To seasonally protect winter GRSG habitat from disruptive activity in GHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include winter habitat (lacking the principle habitat components of winter GRSG habitat) or are outside the current defined winter habitat

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
GHMA-Beyond 1 mile NSO-**Brood Rearing Habitat TL**-No surface disturbance allowed between July 1 – October 31.	**Purpose:** To seasonally protect brood-rearing GRSG habitat from disruptive activity in GHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine that the lek is not active that year (based on ODFW lek survey protocol), and the proposed activity will not take place beyond the season being excepted; • If surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include habitat (lacking the principle habitat components of brood-rearing GRSG habitat) or are outside the current defined brood-rearing area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
GH-beyond 1 mile NSO-**Breeding and Nesting Habitat TL**-No surface disturbance allowed between March 1 – June 30.	**Purpose:** To seasonally protect breeding and nesting GRSG habitat from disruptive activity in GHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine that the lek is not active that year (based on ODFW lek survey protocol), and the proposed activity will not take place beyond the season being excepted; • If surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat) or are outside the current defined breeding and nesting habitat area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
Surface occupancy or use in occupied habitat is subject to the following operating constraints: • The development meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season). • The development meets tall structure restrictions (a tall	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG of the lek from habitat loss and GRSG populations from disturbance outside of GHMA. **Exception:** None. **Modification:** None. **Waiver:** Application of the above use restrictions and meeting objectives within GHMA may be waived by the Field Manager if off-site mitigation is successfully completed in PHMA or opportunity areas, following discussion with BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
structure is any man-made structure that has the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decrease the use of an area; a determination as to whether something is considered a tall structure would be determined based on local conditions such as vegetation or topography). • Environmental compliance documents associated with the activity consider how to limit habitat fragmentation.	
Surface-disturbing activities within GRSG habitat would require coordination with ODFW during project implementation and implementation of best management practices (e.g., anti-perch devices for raptors, etc.)	**Purpose:** To minimize disturbance to GRSG within GHMA. **Exception:** None. **Modification:** None. **Waiver:** Application of the above use restrictions and meeting objectives within general habitat may be waived by the Field Manager if off-site mitigation is successfully completed in priority habitat or opportunity areas, following discussion with BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.
Alternative E	
Core Area Habitat is closed, no stipulations apply. Low Density Habitat Stipulations: • Determine whether project will impact habitat and, if impacts are unavoidable, recommend habitat mitigation alternatives consistent with the Fish and Wildlife Habitat Mitigation Policy. • Appropriate set-back distances (thresholds) regarding density (number of units per area), size (total area disturbed), and noise levels of energy	**Exception:** No exceptions. **Modification:** No modifications. **Waiver:** No waivers.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
developments need examination to determine effects on GRSG. Until better information is available, managers should err on the side of the birds' biology and use the greatest set-back distance where feasible and necessary.	
	Alternative F
Not applicable	PHMAs and GHMAs are closed to fluid mineral leasing
	Proposed Plan
No surface occupancy within Sagebrush Focal Areas (SFA)	**Purpose:** To maintain and enhance Sagebrush Focal Areas to achieve the desired conditions of maintaining a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6) and Table 2-4. As per the October 27, 2014 FWS memorandum, FWS identifies areas that represent recognized "strongholds" for GRSG that have been noted by the conservation community as having the highest densities of GRSG and other criteria important for the persistence of the species. **Exception:** None **Waiver:** None **Modification:** None
No surface occupancy within PHMA.	**Purpose:** To protect GRSG key seasonal habitat, life-history requirements, or behavioral needs of GRSG in proximity to leks, from habitat fragmentation and loss and GRSG populations from disturbance inside priority habitat areas and connectivity habitat areas. **Exception:** The Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: (i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, (ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	(b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP [revision or amendment]. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly." **Modification:** None. **Waiver:** None
No surface disturbance within one mile of a pending or occupied lek located within GHMA.	**Purpose:** To protect GRSG leks and the life-history needs of GRSG in proximity of the lek from habitat loss and GRSG populations from disturbance inside and out of GHMA. **Exception:** The Authorized Officer may grant an exception in coordination with ODFW during project implementation and if best management practices (e.g., anti-perch devices for raptors, etc.) are implemented. **Modification:** None. **Waiver:** Application of the above use restrictions and meeting objectives within general habitat may be waived by the Field Manager if off-site mitigation is successfully completed in priority habitat or opportunity areas, following discussion with BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.
No surface occupancy in areas outside of PHMA but within one mile of a pending or occupied lek, when the lek is located within PHMA.	**Purpose:** To protect occupied GRSG leks and the life-history needs of GRSG in proximity to the lek from habitat loss and GRSG populations from disturbance inside and out of priority habitat areas, to protect PHMA leks when they occur near PHMA boundary.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	Exception: The Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: (i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, (ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP [revision or amendment]. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly." **Modification:** None. **Waiver:** None.
Required Design Features	Required Design Features for Fluid Minerals, as found in Appendix C, would be applied during the permitting process, unless at least one of the following can be demonstrated in the NEPA analyses associated with the specific project: • A specific design feature is documented to not be applicable to the site-specific conditions of the project/activity; • A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat;

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	• Analyses conclude that following a specific feature will provide no more protection to GRSG or its habitat than not following it, for the specific project being proposed.
GHMA beyond 1 mile of an occupied lek, if the lek is within general habitat, would be designated as open to oil and gas leasing subject to CSU stipulations and the following timing stipulations: • Winter habitat from November 1 to February 28 • Breeding, nesting, and early-brood rearing habitat from March 1 to June 30 • Brood rearing/Summer habitat from July 1 to October 31 Where lease surface development is allowed within GHMA, development could occur only if it adheres to the following controlled surface use stipulations: • The development meets noise restrictions (noise at occupied lek less than 10 decibels above ambient sound levels from 2 hours before to 2 hours after sunrise and sunset during breeding season). • The development meets tall structure restrictions (e.g., Tall structures are any man-made structure within GHMA that has the potential to disrupt lekking or nesting birds by creating perching/nesting opportunities for predators (e.g., raptors, ravens) or decrease the use of an area by sage-grouse). • Operators must submit a site-specific plan of development for roads, wells, pipelines, and other infrastructure prior to	See Exceptions, Modifications, and Waivers below.

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
any development being authorized; this plan should outline how development on the lease will limit habitat fragmentation; GHMA within and beyond the 1 mile NSO area would require coordination with ODFW during project implementation and implementation of BMPs.	
GHMA- Beyond 1 mile NSO- **Winter Habitat TL**-No surface disturbance allowed between November 1– February 28.	**Purpose:** To seasonally protect winter GRSG habitat from disruptive activity in GHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include winter habitat (lacking the principle habitat components of winter GRSG habitat as defined in GRSG habitat indicators Table 2-4) or are outside the current defined winter habitat area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
GHMA-beyond 1 mile NSO- **Breeding, Nesting, and Early Brood Rearing Habitat TL**-No surface disturbance allowed between March 1 to June 30.	**Purpose:** To seasonally protect breeding, nesting, and early brood rearing GRSG habitat from disruptive activity in PGHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine there are no active or occupied leks located within 4 miles of the proposed project during the year (based on ODFW lek survey protocol), and the

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include habitat (lacking the principle habitat components of GRSG habitat as defined in the GRSG habitat indicators Table 2-4) or are outside the current defined breeding, nesting, and early brood rearing habitat area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
GHMA-Beyond 1 mile NSO- **Brood Rearing and Summer Habitat TL**-No surface disturbance allowed between July 1 to October 31	**Purpose:** To seasonally protect brood-rearing and summer GRSG habitat from disruptive activity in GHMA. **Exception:** Exceptions to the seasonal restrictions and use restrictions could be granted by the Field Manager under the following conditions: • If surveys determine there are no active or occupied leks located within 4 miles of the proposed project during the year (based on ODFW lek survey protocol), and the proposed activity will not take place beyond the season being excepted; • If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated; **Modification:** Additionally, the Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: • If portions of the area do not include habitat (lacking the principle habitat components of breeding and brood-rearing GRSG habitat as defined in the GRSG habitat indicators Table 2-4) or are outside the current defined brood-rearing area, as determined by the BLM in

Table F-1
Fluid Mineral Stipulations and Exception, Modification, and Waiver Criteria

Stipulation	Stipulation Description
	discussion with the ODFW, and indirect impacts would be mitigated; • If documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) reflect a need to change the given dates in order to better protect when GRSG use a given area, and the proposed activity will not take place beyond the season being excepted. **Waiver:** None.
• Surface-disturbing activities within GHMA would require coordination with ODFW during project implementation and implementation of best management practices	**Purpose:** To minimize disturbance to GRSG within GHMA. **Exception:** None. **Modification:** None. **Waiver:** Application of the above use restrictions and meeting objectives within GHMA may be waived by the Field Manager if off-site mitigation is successfully completed in priority habitat or opportunity areas, following discussion with BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance and/or mortality of birds, disturbances will not be approved during the sensitive seasons.

Appendix G
Monitoring Framework

THE GREATER SAGE-GROUSE MONITORING FRAMEWORK

Bureau of Land Management
U.S. Forest Service

Developed by the Interagency Greater Sage-Grouse Disturbance and Monitoring Subteam

May 30, 2014

The Greater Sage-Grouse Monitoring Framework

Developed by the Interagency Greater Sage-Grouse Disturbance and Monitoring Subteam

INTRODUCTION

The purpose of this U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS) Greater Sage-Grouse Monitoring Framework (hereafter, monitoring framework) is to describe the methods to monitor habitats and evaluate the implementation and effectiveness of the BLM's national planning strategy (attachment to BLM Instruction Memorandum 2012-044), the BLM resource management plans (RMPs), and the USFS's land management plans (LMPs) to conserve the species and its habitat. The regulations for the BLM (43 CFR 1610.4-9) and the USFS (36 CFR part 209, published July 1, 2010) require that land use plans establish intervals and standards, as appropriate, for monitoring and evaluations based on the sensitivity of the resource to the decisions involved. Therefore, the BLM and the USFS will use the methods described herein to collect monitoring data and to evaluate implementation and effectiveness of the Greater Sage-Grouse (GRSG) (hereafter, sage-grouse) planning strategy and the conservation measures contained in their respective land use plans (LUPs). A monitoring plan specific to the Environmental Impact Statement, land use plan, or field office will be developed after the Record of Decision is signed. For a summary of the frequency of reporting, see Attachment A, An Overview of Monitoring Commitments. Adaptive management will be informed by data collected at any and all scales.

To ensure that the BLM and the USFS are able to make consistent assessments about sage-grouse habitats across the range of the species, this framework lays out the methodology—at multiple scales—for monitoring of implementation and disturbance and for evaluating the effectiveness of BLM and USFS actions to conserve the species and its habitat. Monitoring efforts will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. Implementation monitoring results will allow the BLM and the USFS to evaluate the extent that decisions from their LUPs to conserve sage-grouse and their habitat have been implemented. State fish and wildlife agencies will collect population monitoring information, which will be incorporated into effectiveness monitoring as it is made available.

This multiscale monitoring approach is necessary, as sage-grouse are a landscape species and conservation is scale-dependent to the extent that conservation actions are implemented within seasonal habitats to benefit populations. The four orders of habitat selection (Johnson 1980) used in this monitoring framework are described by Connelly et al. (2003) and were applied specifically to the scales of sage-grouse habitat selection by Stiver et al. (*in press)* as first order (broad scale), second order (mid scale), third order (fine scale), and fourth order (site scale). Habitat selection and habitat use by sage-grouse occur at multiple scales and are driven by multiple environmental and behavioral factors. Managing and monitoring sage-grouse habitats are complicated by the differences in habitat selection across the range and habitat use by individual birds within a given season. Therefore, the tendency to look at a single indicator of habitat suitability or only one scale limits managers' ability to identify the threats to sage-grouse

and to respond at the appropriate scale. For descriptions of these habitat suitability indicators for each scale, see "Sage-Grouse Habitat Assessment Framework: Multiscale Habitat Assessment Tool" (HAF; Stiver et al. *in press*).

Monitoring methods and indicators in this monitoring framework are derived from the current peer-reviewed science. Rangewide, best available datasets for broad- and mid-scale monitoring will be acquired. If these existing datasets are not readily available or are inadequate, but they are necessary to inform the indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions, the BLM and the USFS will strive to develop datasets or obtain information to fill these data gaps. Datasets that are not readily available to inform the fine- and site-scale indicators will be developed. These data will be used to generate monitoring reports at the appropriate and applicable geographic scales, boundaries, and analysis units: across the range of sage-grouse as defined by Schroeder et al. (2004), and clipped by Western Association of Fish and Wildlife Agencies (WAFWA) Management Zone (MZ) (Stiver et al. 2006) boundaries and other areas as appropriate for size (e.g., populations based on Connelly et al. 2004). (See Figure 1, Map of Greater Sage-Grouse range, populations, subpopulations, and Priority Areas for Conservation as of 2013.) This broad- and mid-scale monitoring data and analysis will provide context for RMP/LMP areas; states; GRSG Priority Habitat, General Habitat, and other sage-grouse designated management areas; and Priority Areas for Conservation (PACs), as defined in "Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report" (Conservation Objectives Team [COT] 2013). Hereafter, all of these areas will be referred to as "sage-grouse areas."

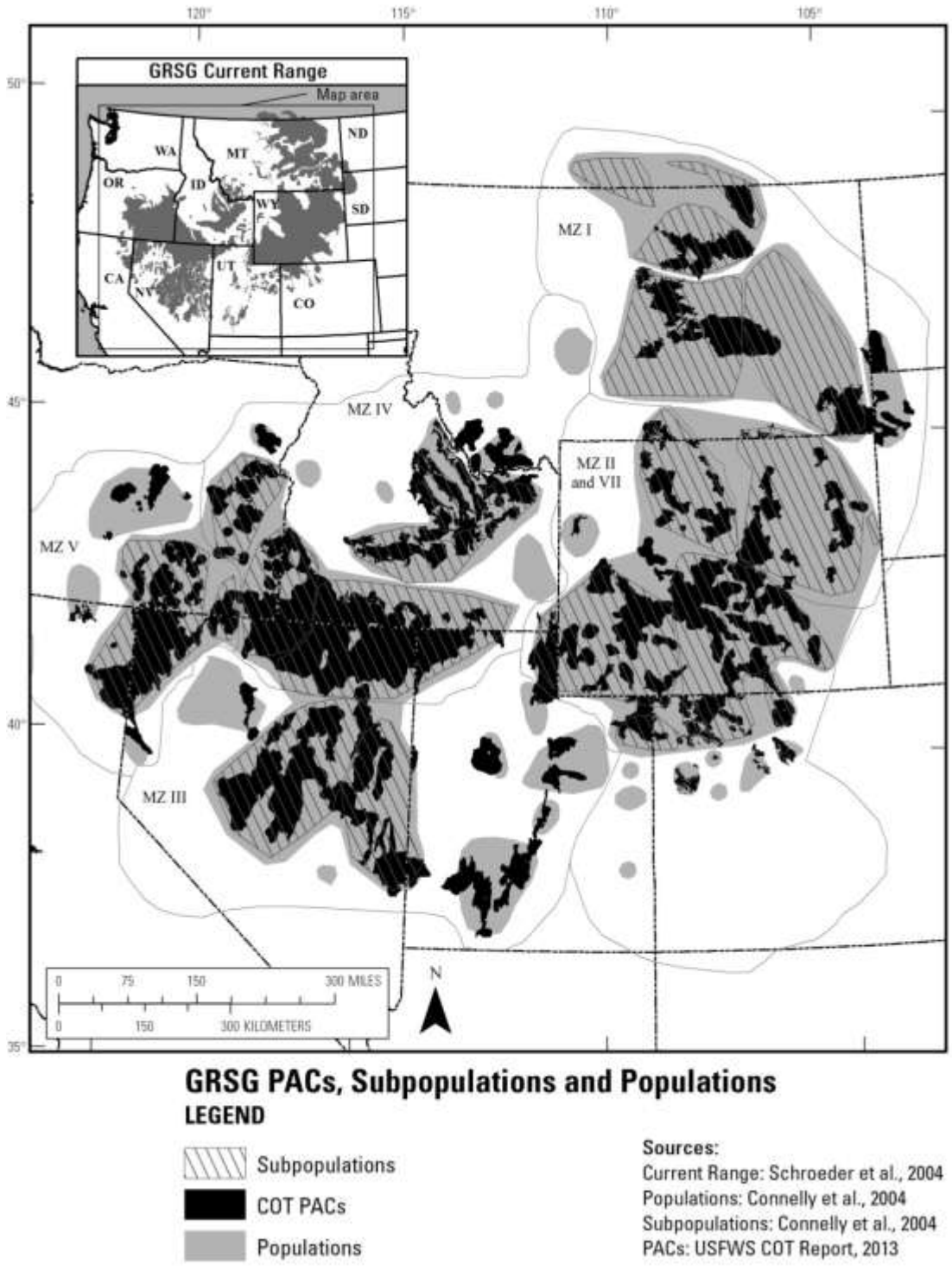

Figure 1. Map of Greater Sage-Grouse range, populations, subpopulations, and Priority Areas for Conservation as of 2013.

This monitoring framework is divided into two sections. The broad- and mid-scale methods, described in Section I, provide a consistent approach across the range of the species to monitor implementation decisions and actions, mid-scale habitat attributes (e.g., sagebrush availability and habitat degradation), and population changes to determine the effectiveness of the planning strategy and management decisions. (See Table 1, Indicators for monitoring implementation of the national planning strategy, RMP/LMP decisions, sage-grouse habitat, and sage-grouse populations at the broad and mid scales.) For sage-grouse habitat at the fine and site scales, described in Section II, this monitoring framework describes a consistent approach (e.g., indicators and methods) for monitoring sage-grouse seasonal habitats. Funding, support, and dedicated personnel for broad- and mid-scale monitoring will be renewed annually through the normal budget process. For an overview of BLM and USFS multiscale monitoring commitments, see Attachment A.

Table 1. Indicators for monitoring implementation of the national planning strategy, RMP/LMP decisions, sage-grouse habitat, and sage-grouse populations at the broad and mid scales.

	Implementation	Habitat		Population (State Wildlife Agencies)
Geographic Scales		Availability	Degradation	Demographics
Broad Scale: From the range of sage-grouse to WAFWA Management Zones	BLM/USFS National planning strategy goal and objectives	Distribution and amount of sagebrush within the range	Distribution and amount of energy, mining, and infrastructure facilities	WAFWA Management Zone population trend
Mid Scale: From WAFWA Management Zone to populations; PACs	RMP/LMP decisions	Mid-scale habitat indicators (HAF; Table 2 herein, e.g., percent of sagebrush per unit area)	Distribution and amount of energy, mining, and infrastructure facilities (Table 2 herein)	Individual population trend

I. BROAD AND MID SCALES

First-order habitat selection, the broad scale, describes the physical or geographical range of a species. The first-order habitat of the sage-grouse is defined by populations of sage-grouse associated with sagebrush landscapes, based on Schroeder et al. 2004, and Connelly et al. 2004, and on population or habitat surveys since 2004. An intermediate scale between the broad and mid scales was delineated by WAFWA from floristic provinces within which similar environmental factors influence vegetation communities. This scale is referred to as the WAFWA Sage-Grouse Management Zones (MZs). Although no indicators are specific to this scale, these MZs are biologically meaningful as reporting units.

Second-order habitat selection, the mid-scale, includes sage-grouse populations and PACs. The second order includes at least 40 discrete populations and subpopulations (Connelly et al. 2004). Populations range in area from 150 to 60,000 mi^2 and are nested within MZs. PACs range from 20 to 20,400 mi^2 and are nested within population areas.

Other mid-scale landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. *in press*) will also be assessed. The methods used to calculate these metrics will be derived from existing literature (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011).

A. Implementation (Decision) Monitoring

Implementation monitoring is the process of tracking and documenting the implementation (or the progress toward implementation) of RMP/LMP decisions. The BLM and the USFS will monitor implementation of project-level and/or site-specific actions and authorizations, with their associated conditions of approval/stipulations for sage-grouse, spatially (as appropriate) within Priority Habitat, General Habitat, and other sage-grouse designated management areas, at a minimum, for the planning area. These actions and authorizations, as well as progress toward completing and implementing activity-level plans, will be monitored consistently across all planning units and will be reported to BLM and USFS headquarters annually, with a summary report every 5 years, for the planning area. A national-level GRSG Land Use Plan Decision Monitoring and Reporting Tool is being developed to describe how the BLM and the USFS will consistently and systematically monitor and report implementation-level activity plans and implementation actions for all plans within the range of sage-grouse. A description of this tool for collection and reporting of tabular and spatially explicit data will be included in the Record of Decision or approved plan. The BLM and the USFS will provide data that can be integrated with other conservation efforts conducted by state and federal partners.

B. Habitat Monitoring

The U.S. Fish and Wildlife Service (USFWS), in its 2010 listing decision for the sage-grouse, identified 18 threats contributing to the destruction, modification, or curtailment of sage-grouse habitat or range (75 FR 13910 2010). The BLM and the USFS will, therefore, monitor the relative extent of these threats that remove sagebrush, both spatially and temporally, on all lands within an analysis area, and will report on amount, pattern, and condition at the appropriate and applicable geographic scales and boundaries. These 18 threats have been aggregated into three broad- and mid-scale measures to account for whether the threat predominantly removes sagebrush or degrades habitat. (See Table 2, Relationship between the 18 threats and the three habitat disturbance measures for monitoring.) The three measures are:

Measure 1: Sagebrush Availability (percent of sagebrush per unit area)

Measure 2: Habitat Degradation (percent of human activity per unit area)

Measure 3: Energy and Mining Density (facilities and locations per unit area)

These three habitat disturbance measures will evaluate disturbance on all lands, regardless of land ownership. The direct area of influence will be assessed with the goal of accounting for actual removal of sagebrush on which sage-grouse depend (Connelly et al. 2000) and for habitat degradation as a surrogate for human activity. Measure 1 (sagebrush availability) examines where disturbances have removed plant communities that support sagebrush (or have broadly removed sagebrush from the landscape). Measure 1, therefore, monitors the change in sagebrush availability—or, specifically, where and how much of the sagebrush community is available within the range of sage-grouse. The sagebrush community is defined as the ecological systems that have the capability of supporting sagebrush vegetation and seasonal sage-grouse habitats within the range of sage-grouse (see Section I.B.1., Sagebrush Availability). Measure 2 (see Section I.B.2., Habitat Degradation Monitoring) and Measure 3 (see Section I.B.3., Energy and Mining Density) focus on where habitat degradation is occurring by using the footprint/area of direct disturbance and the number of facilities at the mid scale to identify the relative amount of degradation per geographic area of interest and in areas that have the capability of supporting sagebrush and seasonal sage-grouse use. Measure 2 (habitat degradation) not only quantifies footprint/area of direct disturbance but also establishes a surrogate for those threats most likely to have ongoing activity. Because energy development and mining activities are typically the most intensive activities in sagebrush habitat, Measure 3 (the density of active energy development, production, and mining sites) will help identify areas of particular concern for such factors as noise, dust, traffic, etc. that degrade sage-grouse habitat.

Table 2. Relationship between the 18 threats and the three habitat disturbance measures for monitoring**.**

Note: Data availability may preclude specific analysis of individual layers. See the detailed methodology for more information.

USFWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Energy and Mining Density
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

The methods to monitor disturbance found herein differ slightly from methods used in Manier et al. 2013, which provided a baseline environmental report (BER) of datasets of disturbance across jurisdictions. One difference is that, for some threats, the BER data were for federal lands only. In addition, threats were assessed individually, using different assumptions from those in this monitoring framework about how to quantify the location and magnitude of threats. The methodology herein builds on the BER methodology and identifies datasets and procedures to use the best available data across the range of the sage-grouse and to formulate a consistent approach to quantify impact of the threats through time. This methodology also describes an approach to combine the threats and calculate each of the three habitat disturbance measures.

B.1. Sagebrush Availability (Measure 1)

Sage-grouse populations have been found to be more resilient where a percentage of the landscape is maintained in sagebrush (Knick and Connelly 2011), which will be determined by sagebrush availability. Measure 1 has been divided into two submeasures to describe sagebrush availability on the landscape:

> Measure 1a: the current amount of sagebrush on the geographic area of interest, and
>
> Measure 1b: the amount of sagebrush on the geographic area of interest compared with the amount of sagebrush the landscape of interest could ecologically support.

Measure 1a (the current amount of sagebrush on the landscape) will be calculated using this formula: [the existing updated sagebrush layer] divided by [the geographic area of interest]. The appropriate geographic areas of interest for sagebrush availability include the species' range, WAFWA MZs, populations, and PACs. In some cases these sage-grouse areas will need to be aggregated to provide an estimate of sagebrush availability with an acceptable level of accuracy.

Measure 1b (the amount of sagebrush for context within the geographic area of interest) will be calculated using this formula: [existing sagebrush divided by [pre-EuroAmerican settlement geographic extent of lands that could have supported sagebrush]. This measure will provide information to set the context for a given geographic area of interest during evaluations of monitoring data. The information could also be used to inform management options for restoration or mitigation and to inform effectiveness monitoring.

The sagebrush base layer for Measure 1 will be based on geospatial vegetation data adjusted for the threats listed in Table 2. The following subsections of this monitoring framework describe the methodology for determining both the current availability of sagebrush on the landscape and the context of the amount of sagebrush on the landscape at the broad and mid scales.

a. Establishing the Sagebrush Base Layer

The current geographic extent of sagebrush vegetation within the rangewide distribution of sage-grouse populations will be ascertained using the most recent version of the Existing Vegetation Type (EVT) layer in LANDFIRE (2013). LANDFIRE EVT was selected to serve as the sagebrush base layer for five reasons: 1) it is the only nationally consistent vegetation layer that has been updated multiple times since 2001; 2) the ecological systems classification within LANDFIRE EVT includes multiple sagebrush type classes that, when aggregated, provide a more accurate (compared with individual classes) and seamless sagebrush base layer across jurisdictional boundaries; 3) LANDFIRE performed a rigorous accuracy assessment from which to derive the rangewide uncertainty of the sagebrush base layer; 4) LANDFIRE is consistently used in several recent analyses of sagebrush habitats (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011); and 5) LANDFIRE EVT can be compared against the geographic extent of lands that are believed to have had the capability of supporting sagebrush vegetation pre-EuroAmerican settlement [LANDFIRE Biophysical Setting (BpS)]. This fifth reason provides a reference point for understanding how much sagebrush currently remains in a defined geographic area of interest compared with how much sagebrush existed historically (Measure 1b). Therefore, the BLM and the USFS have determined that LANDFIRE provides the best available data at broad and mid scales to serve as a sagebrush base layer for monitoring changes in the geographic extent of sagebrush. The BLM and the USFS, in addition to aggregating the sagebrush types into the sagebrush base layer, will aggregate the accuracy assessment reports from LANDFIRE to document the cumulative accuracy for the sagebrush base layer. The BLM—through its Assessment, Inventory, and Monitoring (AIM) program and, specifically, the BLM's landscape monitoring framework (Taylor et al. 2014)—will provide field data to the LANDFIRE program to support continuous quality improvements of the LANDFIRE EVT layer. The sagebrush layer based on LANDFIRE EVT will allow for the mid-scale estimation of the existing percent of sagebrush across a variety of reporting units. This sagebrush base layer will be adjusted by changes in land cover and successful restoration for future calculations of sagebrush availability (Measures 1a and 1b).

This layer will also be used to determine the trend in other landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. *in press*). In the future, changes in sagebrush availability, generated annually, will be included in the sagebrush base layer. The landscape metrics will be recalculated to examine changes in pattern and abundance of sagebrush at the various geographic boundaries. This information will be included in effectiveness monitoring (See Section I.D., Effectiveness Monitoring).

Within the USFS and the BLM, forest-wide and field office–wide existing vegetation classification mapping and inventories are available that provide a much finer level of data than what is provided through LANDFIRE. Where available, these finer-scale products will be useful for additional and complementary mid-scale indicators and local-scale analyses (see Section II,

Fine and Site Scales). The fact that these products are not available everywhere limits their utility for monitoring at the broad and mid scale, where consistency of data products is necessary across broader geographies.

Data Sources for Establishing and Monitoring Sagebrush Availability

There were three criteria for selecting the datasets for establishing and monitoring the change in sagebrush availability (Measure 1):

- Nationally consistent dataset available across the range
- Known level of confidence or accuracy in the dataset
- Continual maintenance of dataset and known update interval

Datasets meeting these criteria are listed in Table 3, Datasets for establishing and monitoring changes in sagebrush availability.

LANDFIRE Existing Vegetation Type (EVT) Version 1.2

LANDFIRE EVT represents existing vegetation types on the landscape derived from remote sensing data. Initial mapping was conducted using imagery collected in approximately 2001. Since the initial mapping there have been two update efforts: version 1.1 represents changes before 2008, and version 1.2 reflects changes on the landscape before 2010. Version 1.2 will be used as the starting point to develop the sagebrush base layer.

Sage-grouse subject matter experts determined which of the ecological systems from the LANDFIRE EVT to use in the sagebrush base layer by identifying the ecological systems that have the capability of supporting sagebrush vegetation and that could provide suitable seasonal habitat for the sage-grouse. (See Table 4, Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.) Two additional vegetation types that are not ecological systems were added to the EVT: *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance. These alliances have species composition directly related to the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system, both of which are ecological systems in LANDFIRE BpS. In LANDFIRE EVT, however, in some map zones, the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system were named *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance, respectively.

Table 3. Datasets for establishing and monitoring changes in sagebrush availability.

Dataset	Source	Update Interval	Most Recent Version Year	Use
BioPhysical Setting v1.1	LANDFIRE	Static	2008	Denominator for sagebrush availability
Existing Vegetation Type v1.2	LANDFIRE	Static	2010	Numerator for sagebrush availability
Cropland Data Layer	National Agricultural Statistics Service	Annual	2012	Agricultural updates; removes existing sagebrush from numerator of sagebrush availability
National Land Cover Dataset Percent Imperviousness	Multi-Resolution Land Characteristics Consortium (MRLC)	5-Year	2011 (next available in 2016)	Urban area updates; removes existing sagebrush from numerator of sagebrush availability
Fire Perimeters	GeoMac	Annual	2013	< 1,000-acre fire updates; removes existing sagebrush from numerator of sagebrush availability
Burn Severity	Monitoring Trends in Burn Severity	Annual	2012 (2-year delay in data availability)	> 1,000-acre fire updates; removes existing sagebrush from numerator of sagebrush availability except for unburned sagebrush islands

Table 4. Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability of Producing
Colorado Plateau Mixed Low Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longiloba* *Artemisia bigelovii* *Artemisia nova* *Artemisia frigida* *Artemisia tridentata* ssp. *wyomingensis*
Columbia Plateau Low Sagebrush Steppe	*Artemisia arbuscula* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova*

Columbia Plateau Scabland Shrubland	*Artemisia rigida*
Columbia Plateau Steppe and Grassland	*Artemisia* spp.
Great Basin Xeric Mixed Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longicaulis* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Big Sagebrush Shrubland	*Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Big Sagebrush Steppe	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *tripartita* *Artemisia frigida*
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland and Shrubland	*Artemisia tridentata* ssp. *vaseyana* *Artemisia arbuscula* *Artemisia tridentata*
Inter-Mountain Basins Mixed Salt Desert Scrub	*Artemisia tridentata* ssp. *wyomingensis* *Artemisia spinescens*
Inter-Mountain Basins Montane Sagebrush Steppe	*Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia nova* *Artemisia arbuscula* *Artemisia tridentata* ssp. *spiciformis*
Inter-Mountain Basins Semi-Desert Shrub-Steppe	*Artemisia tridentata* *Artemisia bigelovii* *Artemisia tridentata* ssp. *wyomingensis*
Northwestern Great Plains Mixed Grass Prairie	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *vaseyana* *Artemisia frigida*
Northwestern Great Plains Shrubland	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis*
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	*Artemisia tridentata*
Rocky Mountain Lower Montane-Foothill Shrubland	*Artemisia nova* *Artemisia tridentata* *Artemisia frigida*
Western Great Plains Floodplain Systems	*Artemisia cana* ssp. *cana*
Western Great Plains Sand Prairie	*Artemisia cana* ssp. *cana*
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	*Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *rupicola*
Artemisia tridentata ssp. *vaseyana* Shrubland Alliance (EVT only)	*Artemisia tridentata* ssp. *vaseyana*
Quercus gambelii Shrubland Alliance (EVT only)	*Artemisia tridentata*

Accuracy and Appropriate Use of LANDFIRE Datasets

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in Table 4 will be merged into one value that represents the sagebrush base layer. With all ecological systems aggregated, the combined accuracy of the sagebrush base layer (EVT) will be much greater than if all categories were treated separately.

LANDFIRE performed the original accuracy assessment of its EVT product on a map zone basis. There are 20 LANDFIRE map zones that cover the historical range of sage-grouse as defined by Schroeder (2004). (See Attachment B, User and Producer Accuracies for Aggregated Ecological Systems within LANDFIRE Map Zones.) The aggregated sagebrush base layer for monitoring had user accuracies ranging from 57.1% to 85.7% and producer accuracies ranging from 56.7% to 100%.

LANDFIRE EVT data are not designed to be used at a local level. In reports of the percent sagebrush statistic for the various reporting units (Measure 1a), the uncertainty of the percent sagebrush will increase as the size of the reporting unit gets smaller. LANDFIRE data should never be used at the 30m pixel level (900m^2 resolution of raster data) for any reporting. The smallest geographic extent for using the data to determine percent sagebrush is at the PAC level; for the smallest PACs, the initial percent sagebrush estimate will have greater uncertainties compared with the much larger PACs.

Agricultural Adjustments for the Sagebrush Base Layer

The dataset for the geographic extent of agricultural lands will come from the National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL) (http://www.nass.usda.gov/research/Cropland/Release/index.htm). CDL data are generated annually, with estimated producer accuracies for "large area row crops ranging from the mid 80% to mid-90%," depending on the state (http://www.nass.usda.gov/research/Cropland/sarsfaqs2.htm#Section3_18.0). Specific information on accuracy may be found on the NASS metadata website (http://www.nass.usda.gov/research/Cropland/metadata/meta.htm). CDL provided the only dataset that matches the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in this monitoring framework and represents the best available agricultural lands mapping product.

The CDL data contain both agricultural classes and nonagricultural classes. For this effort, and in the baseline environmental report (Manier et al. 2013), nonagricultural classes were removed from the original dataset. The excluded classes are:

> Barren (65 & 131), Deciduous Forest (141), Developed/High Intensity (124), Developed/Low Intensity (122), Developed/Med Intensity (123), Developed/Open Space (121), Evergreen Forest (142), Grassland Herbaceous (171), Herbaceous Wetlands (195), Mixed Forest (143), Open

Water (83 & 111), Other Hay/Non Alfalfa (37), Pasture/Hay (181), Pasture/Grass (62), Perennial Ice/Snow (112), Shrubland (64 & 152), Woody Wetlands (190).

The rule set for adjusting the sagebrush base layer for agricultural lands (and for updating the base layer for agricultural lands in the future) is that once an area is classified as agriculture in any year of the CDL, those pixels will remain out of the sagebrush base layer even if a new version of the CDL classifies that pixel as one of the nonagricultural classes listed above. The assumption is that even though individual pixels may be classified as a nonagricultural class in any given year, the pixel has not necessarily been restored to a natural sagebrush community that would be included in Table 4. A further assumption is that once an area has moved into agricultural use, it is unlikely that the area would be restored to sagebrush. Should that occur, however, the method and criteria for adding pixels back into the sagebrush base layer would follow those found in the sagebrush restoration monitoring section of this monitoring framework (see Section I.B.1.b., Monitoring Sagebrush Availability).

Urban Adjustments for the Sagebrush Base Layer

The National Land Cover Database (NLCD) (Fry et al. 2011) includes a percent imperviousness dataset that was selected as the best available dataset to be used for urban adjustments and monitoring. These data are generated on a 5-year cycle and are specifically designed to support monitoring efforts. Other datasets were evaluated and lacked the spatial specificity that was captured in the NLCD product. Any new impervious pixel in NLCD will be removed from the sagebrush base layer through the monitoring process. Although the impervious surface layer includes a number of impervious pixels outside of urban areas, this is acceptable for the adjustment and monitoring for two reasons. First, an evaluation of national urban area datasets did not reveal a layer that could be confidently used in conjunction with the NLCD product to screen impervious pixels outside of urban zones. This is because unincorporated urban areas were not being included, thus leaving large chunks of urban pixels unaccounted for in this rule set. Second, experimentation with setting a threshold on the percent imperviousness layer that would isolate rural features proved to be unsuccessful. No combination of values could be identified that would result in the consistent ability to limit impervious pixels outside urban areas. Therefore, to ensure consistency in the monitoring estimates, all impervious pixels will be used.

Fire Adjustments for the Sagebrush Base Layer

Two datasets were selected for performing fire adjustments and updates: GeoMac fire perimeters and Monitoring Trends in Burn Severity (MTBS). An existing data standard in the BLM requires that all fires of more than 10 acres are to be reported to GeoMac; therefore, there will be many small fires of less than 10 acres that will not be accounted for in the adjustment and monitoring attributable to fire. Using fire perimeters from GeoMac, all sagebrush pixels falling

within the perimeter of fires less than 1,000 acres will be used to adjust and monitor the sagebrush base layer.

For fires greater than 1,000 acres, MTBS was selected as a means to account for unburned sagebrush islands during the update process of the sagebrush base layer. The MTBS program (http://www.mtbs.gov) is an ongoing, multiyear project to map fire severity and fire perimeters consistently across the United States. One of the burn severity classes within MTBS is an unburned to low-severity class. This burn severity class will be used to represent unburned islands of sagebrush within the fire perimeter for the sagebrush base layer. Areas within the other severity classes within the fire perimeter will be removed from the base sagebrush layer during the update process. Not all wildfires, however, have the same impacts on the recovery of sagebrush habitat, depending largely on soil moisture and temperature regimes. For example, cooler, moister sagebrush habitat has a higher potential for recovery or, if needed, restoration than does the warmer, dryer sagebrush habitat. These cooler, moister areas will likely be detected as sagebrush in future updates to LANDFIRE.

Conifer Encroachment Adjustment for the Sagebrush Base Layer

Conifer encroachment into sagebrush vegetation reduces the spatial extent of sage-grouse habitat (Davies et al. 2011, Baruch-Mordo et al. 2013). Conifer species that show propensity for encroaching into sagebrush vegetation resulting in sage-grouse habitat loss include various juniper species, such as Utah juniper *(Juniperus osteosperma),* western juniper *(Juniperus occidentalis),* Rocky Mountain juniper *(Juniperus scopulorum),* pinyon species, including singleleaf pinyon *(Pinus monophylla)* and pinyon pine *(Pinus edulis),* ponderosa pine *(Pinus ponderosa),* lodgepole pine *(Pinus contorta),* and Douglas fir *(Pseudotsuga menziesii)* (Gruell et al. 1986, Grove et al. 2005, Davies et al. 2011).

A rule set for conifer encroachment was developed to adjust the sagebrush base layer. To capture the geographic extent of sagebrush that is likely to experience conifer encroachment, ecological systems within LANDFIRE EVT version 1.2 (NatureServe 2011) were identified if they had the capability of supporting both the conifer species (listed above) and sagebrush vegetation. Those ecological systems were deemed to be the plant communities with conifers most likely to encroach into sagebrush vegetation. (See Table 5, Ecological systems with conifers most likely to encroach into sagebrush vegetation.) Sagebrush vegetation was defined as including sagebrush species or subspecies that provide habitat for the Greater Sage-Grouse and that are included in the HAF. (See Attachment C, Sagebrush Species and Subspecies Included in the Selection Criteria for Building the EVT and BpS Layers.) An adjacency analysis was conducted to identify all sagebrush pixels that were directly adjacent to these conifer ecological systems, and these pixels were removed from the sagebrush base layer.

Table 5. Ecological systems with conifers most likely to encroach into sagebrush vegetation.

EVT Ecological Systems	Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability of Producing
Colorado Plateau Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus osteosperma* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia bigelovii* *Artemisia pygmaea*
Columbia Plateau Western Juniper Woodland and Savanna	*Juniperus occidentalis* *Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia rigida* *Artemisia tridentata* ssp. *vaseyana*
East Cascades Oak-Ponderosa Pine Forest and Woodland	*Pinus ponderosa* *Pseudotsuga menziesii* *Artemisia tridentata* *Artemisia nova*
Great Basin Pinyon-Juniper Woodland	*Pinus monophylla* *Juniperus osteosperma* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* *Artemisia tridentata* ssp. *vaseyana*
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	*Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *vaseyana*
Rocky Mountain Foothill Limber Pine-Juniper Woodland	*Juniperus osteosperma* *Juniperus scopulorum* *Artemisia nova* *Artemisia tridentata*
Rocky Mountain Poor-Site Lodgepole Pine Forest	*Pinus contorta* *Pseudotsuga menziesii* *Pinus ponderosa* *Artemisia tridentata*
Southern Rocky Mountain Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus monosperma* *Artemisia bigelovii* *Artemisia tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana*
Southern Rocky Mountain Ponderosa Pine Woodland	*Pinus ponderosa* *Pseudotsuga menziesii*

	Pinus edulis *Pinus contorta* *Juniperus* spp. *Artemisia nova* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *vaseyana*

Invasive Annual Grasses Adjustments for the Sagebrush Base Layer

There are no invasive species datasets from 2010 to the present (beyond the LANDFIRE data) that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in the determination of the sagebrush base layer. For a description of how invasive species land cover will be incorporated in the sagebrush base layer in the future, see Section I.B.1.b., Monitoring Sagebrush Availability.

Sagebrush Restoration Adjustments for the Sagebrush Base Layer

There are no datasets from 2010 to the present that could provide additions to the sagebrush base layer from restoration treatments that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated); therefore, no adjustments were made to the sagebrush base layer calculated from the LANDFIRE EVT (version 1.2) attributable to restoration activities since 2010. Successful restoration treatments before 2010 are assumed to have been captured in the LANDFIRE refresh.

b. Monitoring Sagebrush Availability

Monitoring Sagebrush Availability

Sagebrush availability will be updated annually by incorporating changes to the sagebrush base layer attributable to agriculture, urbanization, and wildfire. The monitoring schedule for the existing sagebrush base layer updates is as follows:

> ***2010 Existing Sagebrush Base Layer*** = [Sagebrush EVT] minus [2006 Imperviousness Layer] minus [2009 and 2010 CDL] minus [2009/10 GeoMac Fires that are less than 1,000 acres] minus [2009/10 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter] minus [Conifer Encroachment Layer]
>
> ***2012 Existing Sagebrush Update*** = [2010 Existing Sagebrush Base Layer] minus [2011 Imperviousness Layer] minus [2011 and 2012 CDL] minus [2011/12 GeoMac Fires < 1,000 acres] minus [2011/12 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter]
>
> ***Monitoring Existing Sagebrush post 2012*** = [Previous Existing Sagebrush Update Layer] minus [Imperviousness Layer (if new data are available)] minus [Next 2 years of CDL] minus [Next 2 years of GeoMac Fires < 1,000 acres] minus [Next 2 years of MTBS Fires that are greater than

1,000 acres, excluding unburned sagebrush islands within the perimeter] plus [restoration/monitoring data provided by the field]

Monitoring Sagebrush Restoration

Restoration after fire, after agricultural conversion, after seedings of introduced grasses, or after treatments of pinyon pine and/or juniper are examples of updates to the sagebrush base layer that can add sagebrush vegetation back into sagebrush availability in the landscape. When restoration has been determined to be successful through rangewide, consistent, interagency fine- and site-scale monitoring, the polygonal data will be used to add sagebrush pixels back into the broad- and mid-scale sagebrush base layer.

Measure 1b: Context for Monitoring the Amount of Sagebrush in a Geographic Area of Interest

Measure 1b describes the amount of sagebrush on the landscape of interest compared with the amount of sagebrush the landscape of interest could ecologically support. Areas with the potential to support sagebrush were derived from the BpS data layer that describes sagebrush pre-EuroAmerican settlement (v1.2 of LANDFIRE).

The identification and spatial locations of natural plant communities (vegetation) that are believed to have existed on the landscape (BpS) were constructed based on an approximation of the historical (pre-EuroAmerican settlement) disturbance regime and how the historical disturbance regime operated on the current biophysical environment. BpS is composed of map units that are based on NatureServe (2011) terrestrial ecological systems classification.

The ecological systems within BpS used for this monitoring framework are those ecological systems that are capable of supporting sagebrush vegetation and of providing seasonal habitat for sage-grouse (Table 4). Ecological systems selected included sagebrush species or subspecies that are included in the HAF and listed in Attachment C.

The BpS layer does not have an associated accuracy assessment, given the lack of any reference data. Visual inspection of the BpS data, however, reveals inconsistencies in the labeling of pixels among LANDFIRE map zones. The reason for these inconsistencies is that the rule sets used to map a given ecological system will vary among map zones based on different physical, biological, disturbance, and atmospheric regimes of the region. These variances can result in artificial edges in the map. Metrics will be calculated, however, at broad spatial scales using BpS potential vegetation type, not small groupings or individual pixels. Therefore, the magnitude of these observable errors in the BpS layer will be minor compared with the size of the reporting units. Since BpS will be used to identify broad landscape patterns of dominant vegetation, these inconsistencies will have only a minor impact on the percent sagebrush availability calculation. *As with the LANDFIRE EVT, LANDFIRE BpS data are not designed to be used at a local level*. LANDFIRE data should never be used at the 30m pixel level for reporting.

In conclusion, sagebrush availability data will be used to inform effectiveness monitoring and initiate adaptive management actions as necessary. The 2010 estimate of sagebrush availability will serve as the base year, and an updated estimate for 2012 will be reported in 2014 after all datasets become available. The 2012 estimate will capture changes attributable to wildfire, agriculture, and urban development. Subsequent updates will always include new fire and agricultural data and new urban data when available. Restoration data that meet the criteria for adding sagebrush areas back into the sagebrush base layer will be factored in as data allow. Given data availability, there will be a 2-year lag (approximately) between when the estimate is generated and when the data used for the estimate become available (e.g., the 2014 sagebrush availability will be included in the 2016 estimate).

Future Plans

Geospatial data used to generate the sagebrush base layer will be available through the BLM's EGIS web portal and geospatial gateway or through the authoritative data source. Legacy datasets will be preserved so that trends may be calculated. Additionally, accuracy assessment data for all source datasets will be provided on the portal either spatially, where applicable, or through the metadata. Accuracy assessment information was deemed vital to help users understand the limitation of the sagebrush estimates; it will be summarized spatially by map zone and will be included in the portal.

LANDFIRE plans to begin a remapping effort in 2015. This remapping has the potential to improve the overall quality of data products greatly, primarily through the use of higher-quality remote sensing datasets. Additionally, the BLM and the Multi-Resolution Land Characteristics Consortium (MRLC) are working to improve the accuracy of vegetation map products for broad- and mid-scale analyses through the Grass/Shrub mapping effort. The Grass/Shrub mapping effort applies the Wyoming multiscale sagebrush habitat methodology (Homer et al. 2009) to depict spatially the fractional percent cover estimates for five components rangewide and West-wide. These five components are percent cover of sagebrush vegetation, percent bare ground, percent herbaceous vegetation (grass and forbs combined), annual vegetation, and percent shrubs. A benefit of the design of these fractional cover maps is that they facilitate monitoring "within" class variation (e.g., examination of declining trend in sagebrush cover for individual pixels). This "within" class variation can serve as one indicator of sagebrush quality that cannot be derived from LANDFIRE's EVT information. The Grass/Shrub mapping effort is not a substitute for fine-scale monitoring but will leverage fine-scale data to support the validation of the mapping products. An evaluation will be conducted to determine if either dataset is of great enough quality to warrant replacing the existing sagebrush layers. At the earliest, this evaluation will occur in 2018 or 2019, depending on data availability.

B.2. Habitat Degradation Monitoring (Measure 2)

The measure of habitat degradation will be calculated by combining the footprints of threats identified in Table 2. The footprint is defined as the direct area of influence of "active" energy and infrastructure; it is used as a surrogate for human activity. Although these analyses will try to summarize results at the aforementioned meaningful geographic areas of interest, some may be too small to report the metrics appropriately and may be combined (smaller populations, PACs within a population, etc.). Data sources for each threat are found in Table 6, Geospatial data sources for habitat degradation. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and to calculate trends in habitat degradation to inform adaptive management. A 5-year summary report will be provided to the USFWS.

a. Habitat Degradation Datasets and Assumptions

Energy (oil and gas wells and development facilities)

This dataset will compile information from three oil and gas databases: the proprietary IHS Enerdeq database, the BLM Automated Fluid Minerals Support System (AFMSS) database, and the proprietary Platts (a McGraw-Hill Financial Company) GIS Custom Data (hereafter, Platts) database of power plants. Point data from wells active within the last 10 years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0ha) direct area of influence centered on the well point, as recommended by the BLM WO-300 (Minerals and Realty Management). Plugged and abandoned wells will be removed if the date of well abandonment was before the first day of the reporting year (i.e., for the 2015 reporting year, a well must have been plugged and abandoned by 12/31/2014 to be removed). Platts oil and gas power plants data (subset to operational power plants) will also be included as a 5-acre (2.0ha) direct area of influence.

Additional Measure: Reclaimed Energy-related Degradation. This dataset will include those wells that have been plugged and abandoned. This measure thereby attempts to measure energy-related degradation that has been reclaimed but not necessarily fully restored to sage-grouse habitat. This measure will establish a baseline by using wells that have been plugged and abandoned within the last 10 years from the IHS and AFMSS datasets. Time lags for lek attendance in response to infrastructure have been documented to be delayed 2–10 years from energy development activities (Harju et al. 2010). Reclamation actions may require 2 or more years from the Final Abandonment Notice. Sagebrush seedling establishment may take 6 or more years from the point of seeding, depending on such variables as annual precipitation, annual temperature, and soil type and depth (Pyke 2011). This 10-year period is conservative and assumes some level of habitat improvement 10 years after plugging. Research by Hemstrom et al. (2002), however,

proposes an even longer period—more than 100 years—for recovery of sagebrush habitats, even with active restoration approaches. Direct area of influence will be considered 3 acres (1.2ha) (J. Perry, personal communication, February 12, 2014). This additional layer/measure could be used at the broad and mid scale to identify areas where sagebrush habitat and/or potential sagebrush habitat is likely still degraded. This layer/measure could also be used where further investigation at the fine or site scale would be warranted to: 1) quantify the level of reclamation already conducted, and 2) evaluate the amount of restoration still required for sagebrush habitat recovery. At a particular level (e.g., population, PACs), these areas and the reclamation efforts/success could be used to inform reclamation standards associated with future developments. Once these areas have transitioned from reclamation standards to meeting *restoration* standards, they can be added back into the sagebrush availability layer using the same methodology as described for adding restoration treatment areas lost to wildfire and agriculture conversion (see Monitoring Sagebrush Restoration in Section I.B.1.b., Monitoring Sagebrush Availability). This dataset will be updated annually from the IHS dataset.

Energy (coal mines)

Currently, there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, U.S. Energy Information Administration mine occurrence points, U.S. Office of Surface Mining Reclamation and Enforcement coal mining permit polygons (as available), and U.S. Geological Survey (USGS) Mineral Resources Data System mine occurrence points. These data will inform where active coal mining may be occurring. Additionally, coal power plant data from Platts power plants database (subset to operational power plants) will be included. Aerial imagery will then be used to digitize manually the active coal mining and coal power plants surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active coal mine and power plant direct area of influence. Coal mine location data source and imagery date will be documented for each digitized coal polygon at the time of creation. Subsurface facility locations (polygon or point location as available) will also be collected if available, included in density calculations, and added to the active surface activity layer as appropriate (if an actual direct area of influence can be located).

Energy (wind energy facilities)

This dataset will be a subset of the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where "Type_" = "WINDMILL" will be included. Direct area of influence of these point features will be measured by converting to a polygon dataset as a direct area of

influence of 3 acres (1.2ha) centered on each tower point. See the BLM's "Wind Energy Development Programmatic Environmental Impact Statement" (BLM 2005). Additionally, Platts power plants database will be used for transformer stations associated with wind energy sites (subset to operational power plants), also with a 3-acre (1.2ha) direct area of influence.

Energy (solar energy facilities)

This dataset will include solar plants as compiled with the Platts power plants database (subset to operational power plants). This database includes an attribute that indicates the operational capacity of each solar power plant. Total capacity at the power plant was based on ratings of the in-service unit(s), in megawatts. Direct area of influence polygons will be centered over each point feature representing 7.3ac (3.0ha) per megawatt of the stated operational capacity, per the report of the National Renewable Energy Laboratory (NREL), "Land-Use Requirements for Solar Power Plants in the United States" (Ong et al. 2013).

Energy (geothermal energy facilities)

This dataset will include geothermal wells in existence or under construction as compiled with the IHS wells database and power plants as compiled with the Platts database (subset to operational power plants). Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2ha) centered on each well or power plant point.

Mining (active developments; locatable, leasable, saleable)

This dataset will include active locatable mining locations as compiled with the proprietary InfoMine database. Aerial imagery will then be used to digitize manually the active mining surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active mine direct area of influence. Mine location data source and imagery date will be documented for each digitized polygon at the time of creation. Currently, there are no known compressive databases available for leasable or saleable mining sites beyond coal mines. Other data sources will be evaluated and used as they are identified or as they become available. Point data may be converted to polygons to represent direct area of influence unless actual surface disturbance is available.

Infrastructure (roads)

This dataset will be compiled from the proprietary Esri StreetMap Premium for ArcGIS. Dataset features that will be used are: Interstate Highways, Major Roads, and Surface Streets to capture most paved and "crowned and ditched" roads while not including "two-track" and 4-wheel-drive routes. These minor roads, while not included in the broad- and mid-scale monitoring, may support a volume of traffic that can have deleterious effects on sage-grouse leks. It may be

appropriate to consider the frequency and type of use of roads in a NEPA analysis for a proposed project. This fine- and site-scale analysis will require more site-specific data than is identified in this monitoring framework. The direct area of influence for roads will be represented by 240.2ft, 84.0ft, and 40.7ft (73.2m, 25.6m, and 12.4m) total widths centered on the line feature for Interstate Highways, Major Roads, and Surface Streets, respectively (Knick et al. 2011). The most current dataset will be used for each monitoring update. *Note: This is a related but different dataset than what was used in BER (Manier et al. 2013). Individual BLM/USFS planning units may use different road layers for fine- and site-scale monitoring.*

Infrastructure (railroads)

This dataset will be a compilation from the Federal Railroad Administration Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct are of influence for railroads will be represented by a 30.8ft (9.4m) total width (Knick et al. 2011) centered on the non-abandoned railroad line feature.

Infrastructure (power lines)

This line dataset will be derived from the proprietary Platts transmission lines database. Linear features in the dataset attributed as "buried" will be removed from the disturbance calculation. Only "In Service" lines will be used; "Proposed" lines will not be used. Direct area of influence will be determined by the kV designation: 1–199 kV (100ft/30.5m), 200–399 kV (150ft/45.7m), 400–699 kV (200ft/61.0m), and 700-or greater kV (250ft/76.2m) based on average right-of-way and structure widths, according to BLM WO-300 (Minerals and Realty Management).

Infrastructure (communication towers)

This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed. It will be converted to a polygon dataset by using a direct area of influence of 2.5 acres (1.0ha) centered on each communication tower point (Knick et al. 2011).

Infrastructure (other vertical structures)

This point dataset will be compiled from the FAA's Digital Obstacles point file. Points where "Type_" = "WINDMILL" will be removed. Duplicate points from the FCC communication towers point file will be removed. Remaining features will be converted to a polygon dataset using a direct area of influence of 2.5 acres (1.0ha) centered on each vertical structure point (Knick et al. 2011).

Other Developed Rights-of-Way

Currently, no additional data sources for other rights-of-way have been identified; roads, power lines, railroads, pipelines, and other known linear features are represented in the categories

described above. The newly purchased IHS data do contain pipeline information; however, this database does not currently distinguish between above-ground and underground pipelines. If additional features representing human activities are identified, they will be added to monitoring reports using similar assumptions to those used with the threats described above.

b. Habitat Degradation Threat Combination and Calculation

The threats targeted for measuring human activity (Table 2) will be converted to direct area of influence polygons as described for each threat above. These threat polygon layers will be combined and features dissolved to create one overall polygon layer representing footprints of active human activity in the range of sage-grouse. Individual datasets, however, will be preserved to indicate which types of threats may be contributing to overall habitat degradation.

This measure has been divided into three submeasures to describe habitat degradation on the landscape. Percentages will be calculated as follows:

> Measure 2a. Footprint by geographic area of interest: Divide area of the active/direct footprint by the total area of the geographic area of interest (% disturbance in geographic area of interest).
>
> Measure 2b. Active/direct footprint by historical sagebrush potential: Divide area of the active footprint that coincides with areas with historical sagebrush potential (BpS calculation from habitat availability) within a given geographic area of interest by the total area with sagebrush potential within the geographic area of interest (% disturbance on potential historical sagebrush in geographic area of interest).
>
> Measure 2c. Active/direct footprint by current sagebrush: Divide area of the active footprint that coincides with areas of existing sagebrush (EVT calculation from habitat availability) within a given geographic area of interest by the total area that is current sagebrush within the geographic area of interest (% disturbance on current sagebrush in geographic area of interest).

B.3. Energy and Mining Density (Measure 3)

The measure of density of energy and mining will be calculated by combining the locations of energy and mining threats identified in Table 2. This measure will provide an estimate of the intensity of human activity or the intensity of habitat degradation. The number of energy facilities and mining locations will be summed and divided by the area of meaningful geographic areas of interest to calculate density of these activities. Data sources for each threat are found in Table 6. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed

below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and 5-year (or longer) trends in habitat degradation.

Table 6. Geospatial data sources for habitat degradation (Measure 2).

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300

a. Energy and Mining Density Datasets and Assumptions

Energy (oil and gas wells and development facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (coal mines)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (wind energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (solar energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Energy (geothermal energy facilities)

(See Section I.B.2., Habitat Degradation Monitoring.)

Mining (active developments; locatable, leasable, saleable)

(See Section I.B.2., Habitat Degradation Monitoring.)

b. Energy and Mining Density Threat Combination and Calculation

Datasets for energy and mining will be collected in two primary forms: point locations (e.g., wells) and polygon areas (e.g., surface coal mining). The following rule set will be used to calculate density for meaningful geographic areas of interest including standard grids and per polygon:

1) Point locations will be preserved; no additional points will be removed beyond the methodology described above. Energy facilities in close proximity (an oil well close to a wind tower) will be retained.
2) Polygons will not be merged, or features further dissolved. Thus, overlapping facilities will be retained, such that each individual threat will be a separate polygon data input for the density calculation.
3) The analysis unit (polygon or 640-acre section in a grid) will be the basis for counting the number of mining or energy facilities per unit area. Within the analysis unit, all point features will be summed, and any individual polygons will be counted as one (e.g., a coal mine will be counted as one facility within population). Where polygon features overlap multiple units (polygons or pixels), the facility will be counted as one in each unit where the polygon occurs (e.g., a polygon crossing multiple 640-acre

sections would be counted as one in each 640-acre section for a density per 640-acre-section calculation).

4) In methodologies with different-sized units (e.g., MZs, populations, etc.) raw facility counts will be converted to densities by dividing the raw facility counts by the total area of the unit. Typically this will be measured as facilities per 640 acres.
5) For uniform grids, raw facility counts will be reported. Typically this number will also be converted to facilities per 640 acres.
6) Reporting may include summaries beyond the simple ones above. Zonal statistics may be used to smooth smaller grids to help display and convey information about areas within meaningful geographic areas of interest that have high levels of energy and/or mining activity.
7) Additional statistics for each defined unit may also include adjusting the area to include only the area with the historical potential for sagebrush (BpS) or areas currently sagebrush (EVT).

Individual datasets and threat combination datasets for habitat degradation will be available through the BLM's EGIS web portal and geospatial gateway. Legacy datasets will be preserved so that trends may be calculated.

C. Population (Demographics) Monitoring

State wildlife management agencies are responsible for monitoring sage-grouse populations within their respective states. WAFWA will coordinate this collection of annual population data by state agencies. These data will be made available to the BLM according to the terms of the forthcoming Greater Sage-Grouse Population Monitoring Memorandum of Understanding (MOU) (2014) between WAFWA and the BLM. The MOU outlines a process, timeline, and responsibilities for regular data sharing of sage-grouse population and/or habitat information for the purposes of implementing sage-grouse LUPs/amendments and subsequent effectiveness monitoring. Population areas were refined from the "Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report" (COT 2013) by individual state wildlife agencies to create a consistent naming nomenclature for future data analyses. These population data will be used for analysis at the applicable scale to supplement habitat effectiveness monitoring of management actions and to inform the adaptive management responses.

D. Effectiveness Monitoring

Effectiveness monitoring will provide the data needed to evaluate BLM and USFS actions toward reaching the objective of the national planning strategy (BLM IM 2012-044)—to conserve sage-grouse populations and their habitat—and the objectives for the land use planning

area. Effectiveness monitoring methods described here will encompass multiple larger scales, from areas as large as the WAFWA MZ to the scale of this LUP. Effectiveness data used for these larger-scale evaluations will include all lands in the area of interest, regardless of surface ownership/management, and will help inform where finer-scale evaluations are needed, such as population areas smaller than an LUP or PACs within an LUP (described in Section II, Fine and Site Scales). Data will also include the trend of disturbance within these areas of interest to inform the need to initiate adaptive management responses as described in the land use plan.

Effectiveness monitoring reported for these larger areas provides the context to conduct effectiveness monitoring at finer scales. This approach also helps focus scarce resources to areas experiencing habitat loss, degradation, or population declines, without excluding the possibility of concurrent, finer-scale evaluations as needed where habitat or population anomalies have been identified through some other means.

To determine the effectiveness of the sage-grouse national planning strategy, the BLM and the USFS will evaluate the answers to the following questions and prepare a broad- and mid-scale effectiveness report:

1) Sagebrush Availability and Condition:
    a. What is the amount of sagebrush availability and the change in the amount and condition of sagebrush?
    b. What is the existing amount of sagebrush on the landscape and the change in the amount relative to the pre-EuroAmerican historical distribution of sagebrush (BpS)?
    c. What is the trend and condition of the indicators describing sagebrush characteristics important to sage-grouse?
2) Habitat Degradation and Intensity of Activities:
    a. What is the amount of habitat degradation and the change in that amount?
    b. What is the intensity of activities and the change in the intensity?
    c. What is the amount of reclaimed energy-related degradation and the change in the amount?
3) What is the population estimation of sage-grouse and the change in the population estimation?
4) How are the BLM and the USFS contributing to changes in the amount of sagebrush?
5) How are the BLM and the USFS contributing to disturbance?

The compilation of broad- and mid-scale data (and population trends as available) into an effectiveness monitoring report will occur on a 5-year reporting schedule (see Attachment A), which may be accelerated to respond to critical emerging issues (in consultation with the USFWS and state wildlife agencies). In addition, effectiveness monitoring results will be used to identify emerging issues and research needs and inform the BLM and the USFS adaptive

management strategy (see the adaptive management section of this Environmental Impact Statement).

To determine the effectiveness of the sage-grouse objectives of the land use plan, the BLM and the USFS will evaluate the answers to the following questions and prepare a plan effectiveness report:

1) Is this plan meeting the sage-grouse habitat objectives?
2) Are sage-grouse areas within the LUP meeting, or making progress toward meeting, land health standards, including the Special Status Species/wildlife habitat standard?
3) Is the plan meeting the disturbance objective(s) within sage-grouse areas?
4) Are the sage-grouse populations within this plan boundary and within the sage-grouse areas increasing, stable, or declining?

The effectiveness monitoring report for this LUP will occur on a 5-year reporting schedule (see Attachment A) or more often if habitat or population anomalies indicate the need for an evaluation to facilitate adaptive management or respond to critical emerging issues. Data will be made available through the BLM's EGIS web portal and the geospatial gateway.

Methods

At the broad and mid scales (PACs and above) the BLM and the USFS will summarize the vegetation, disturbance, and (when available) population data. Although the analysis will try to summarize results for PACs within each sage-grouse population, some populations may be too small to report the metrics appropriately and may need to be combined to provide an estimate with an acceptable level of accuracy. Otherwise, they will be flagged for more intensive monitoring by the appropriate landowner or agency. The BLM and the USFS will then analyze monitoring data to detect the trend in the amount of sagebrush; the condition of the vegetation in the sage-grouse areas (MacKinnon et al. 2011); the trend in the amount of disturbance; the change in disturbed areas owing to successful restoration; and the amount of new disturbance the BLM and/or the USFS has permitted. These data could be supplemented with population data (when available) to inform an understanding of the correlation between habitat and PACs within a population. This overall effectiveness evaluation must consider the lag effect response of populations to habitat changes (Garton et al. 2011).

Calculating Question 1, National Planning Strategy Effectiveness: The amount of sagebrush available in the large area of interest will use the information from Measure 1a (I.B.1., Sagebrush Availability) and calculate the change from the 2012 baseline to the end date of the reporting period. To calculate the change in the amount of sagebrush on the landscape to compare with the historical areas with potential to support sagebrush, the information from Measure 1b (I.B.1., Sagebrush Availability) will be used. To calculate the trend in the condition of sagebrush at the mid scale, three sources of data will be used: the BLM's Grass/Shrub mapping effort (Future Plans in Section I.B.1., Sagebrush Availability); the results from the calculation of the landscape

indicators, such as patch size (described below); and the BLM's Landscape Monitoring Framework (LMF) and sage-grouse intensification effort (also described below). The LMF and sage-grouse intensification effort data are collected in a statistical sampling framework that allows calculation of indicator values at multiple scales.

Beyond the importance of sagebrush availability to sage-grouse, the mix of sagebrush patches on the landscape at the broad and mid scale provides the life requisite of space for sage-grouse dispersal needs (see the HAF). The configuration of sagebrush habitat patches and the land cover or land use between the habitat patches at the broad and mid scales also defines suitability. There are three significant habitat indicators that influence habitat use, dispersal, and movement across populations: the size and number of habitat patches, the connectivity of habitat patches (linkage areas), and habitat fragmentation (scope of unsuitable and non-habitats between habitat patches). The most appropriate commercial software to measure patch dynamics, connectivity, and fragmentation at the broad and mid scales will be used, along with the same data layers derived for sagebrush availability.

The BLM initiated the LMF in 2011 in cooperation with the Natural Resources Conservation Service (NRCS). The objective of the LMF effort is to provide unbiased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. Recognizing that sage-grouse populations are more resilient where the sagebrush plant community has certain characteristics unique to a particular life stage of sage-grouse (Knick and Connelly 2011, Stiver et al. *in press*), a group of sage-grouse habitat and sagebrush plant community subject matter experts identified those vegetation indicators collected at LMF sampling points that inform sage-grouse habitat needs. The experts represented the Agricultural Research Service, BLM, NRCS, USFWS, WAFWA, state wildlife agencies, and academia. The common indicators identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, intercanopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of sage-grouse, additional plot locations in occupied sage-grouse habitat (Sage-Grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS National Resources Inventory Rangeland Resource Assessment (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?&cid=stelprdb1041620).

The sage-grouse intensification baseline data will be collected over a 5-year period, and an annual sage-grouse intensification report will be prepared describing the status of the indicators. Beginning in year 6, the annual status report will be accompanied with a trend report, which will be available on an annual basis thereafter, contingent on continuation of the current monitoring budget. This information, in combination with the Grass/Shrub mapping information, the mid-scale habitat suitability indicator measures, and the sagebrush availability information will be used to answer Question 1 of the National Planning Strategy Effectiveness Report.

Calculating Question 2, National Planning Strategy Effectiveness: Evaluations of the amount of habitat degradation and the intensity of the activities in the area of interest will use the information from Measure 2 (Section I.B.2., Habitat Degradation Monitoring) and Measure 3 (Section I.B.3., Energy and Mining Density). The field office will collect data on the amount of reclaimed energy-related degradation on plugged and abandoned and oil/gas well sites. The data are expected to demonstrate that the reclaimed sites have yet to meet the habitat restoration objectives for sage-grouse habitat. This information, in combination with the amount of habitat degradation, will be used to answer Question 2 of the National Planning Strategy Effectiveness Report.

Calculating Question 3, National Planning Strategy Effectiveness: The change in sage-grouse estimated populations will be calculated from data provided by the state wildlife agencies, when available. This population data (Section I.C., Population [Demographics] Monitoring) will be used to answer Question 3 of the National Planning Strategy Effectiveness Report.

Calculating Question 4, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of sagebrush in the area of interest will use the information from Measure 1a (Section I.B.1., Sagebrush Availability). This measure is derived from the national datasets that remove sagebrush (Table 3). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for this measure in the geographic areas of interest. This information will be used to answer Question 4 of the National Planning Strategy Effectiveness Report.

Calculating Question 5, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of disturbance in the area of interest will use the information from Measure 2a (Section I.B.2., Monitoring Habitat Degradation) and Measure 3 (Section I.B.3., Energy and Mining Density). These measures are all derived from the national disturbance datasets that degrade habitat (Table 6). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for these two measures in the geographic areas of interest. This information will be used to answer Question 5 of the National Planning Strategy Effectiveness Report.

Answers to the five questions for determining the effectiveness of the national planning strategy will identify areas that appear to be meeting the objectives of the strategy and will facilitate identification of population areas for more detailed analysis. Conceptually, if the broad-scale monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing population for the area of interest, there is evidence that the objectives of the national planning strategy to maintain populations and their habitats have been met. Conversely, where information indicates that sagebrush is decreasing and vegetation conditions are degrading, disturbance in sage-grouse areas is increasing, and/or

populations are declining relative to the baseline, there is evidence that the objectives of the national planning strategy are not being achieved. Such a determination would likely result in a more detailed analysis and could be the basis for implementing more restrictive adaptive management measures.

With respect to the land use plan area, the BLM and the USFS will summarize the vegetation, disturbance, and population data to determine if the LUP is meeting the plan objectives. Effectiveness information used for these evaluations includes BLM/USFS surface management areas and will help inform where finer-scale evaluations are needed, such as seasonal habitats, corridors, or linkage areas. Data will also include the trend of disturbance within the sage-grouse areas, which will inform the need to initiate adaptive management responses as described in the land use plan.

Calculating Question 1, Land Use Plan Effectiveness: The condition of vegetation and the allotments meeting land health standards (as articulated in "BLM Handbook 4180-1, Rangeland Health Standards") in sage-grouse areas will be used to determine the LUP's effectiveness in meeting the vegetation objectives for sage-grouse habitat set forth in the plan. The field office/ranger district will be responsible for collecting this data. In order for this data to be consistent and comparable, common indicators, consistent methods, and an unbiased sampling framework will be implemented following the principles in the BLM's AIM strategy (Taylor et al. 2014; Toevs et al. 2011; MacKinnon et al. 2011), in the BLM's Technical Reference "Interpreting Indicators of Rangeland Health" (Pellant et al. 2005), and in the HAF (Stiver et al. *in press*) or other approved WAFWA MZ–consistent guidance to measure and monitor sage-grouse habitats. This information will be used to answer Question 1 of the Land Use Plan Effectiveness Report.

Calculating Question 2, Land Use Plan Effectiveness: Sage-grouse areas within the LUP that are achieving land health stands (or, if trend data are available, that are making progress toward achieving them)—particularly the Special Status Species/wildlife habitat land health standard—will be used to determine the LUP's effectiveness in achieving the habitat objectives set forth in the plan. Field offices will follow directions in "BLM Handbook 4180-1, Rangeland Health Standards," to ascertain if sage-grouse areas are achieving or making progress toward achieving land health standards. One of the recommended criteria for evaluating this land health standard is the HAF indicators.

Calculating Question 3, Land Use Plan Effectiveness: The amount of habitat disturbance in sage-grouse areas identified in this LUP will be used to determine the LUP's effectiveness in meeting the plan's disturbance objectives. National datasets can be used to calculate the amount of disturbance, but field office data will likely increase the accuracy of this estimate. This information will be used to answer Question 3 of the Land Use Plan Effectiveness Report.

Calculating Question 4, Land Use Plan Effectiveness: The change in estimated sage-grouse populations will be calculated from data provided by the state wildlife agencies, when available, and will be used to determine LUP effectiveness. This population data (Section I.C., Population [Demographics] Monitoring) will be used to answer Question 4 of the Land Use Plan Effectiveness Report.

Results of the effectiveness monitoring process for the LUP will be used to inform the need for finer-scale investigations, initiate adaptive management actions as described in the land use plan, initiate causation determination, and/or determine if changes to management decisions are warranted. The measures used at the broad and mid scales will provide a suite of characteristics for evaluating the effectiveness of the adaptive management strategy.

II. FINE AND SITE SCALES

Fine-scale (third-order) habitat selected by sage-grouse is described as the physical and geographic area within home ranges during breeding, summer, and winter periods. At this level, habitat suitability monitoring should address factors that affect sage-grouse use of, and movements between, seasonal use areas. The habitat monitoring at the fine and site scale (fourth order) should focus on indicators to describe seasonal home ranges for sage-grouse associated with a lek or lek group within a population or subpopulation area. Fine- and site-scale monitoring will inform LUP effectiveness monitoring (see Section I.D., Effectiveness Monitoring) and the hard and soft triggers identified in the LUP's adaptive management section.

Site-scale habitat selected by sage-grouse is described as the more detailed vegetation characteristics of seasonal habitats. Habitat suitability characteristics include canopy cover and height of sagebrush and the associated understory vegetation. They also include vegetation associated with riparian areas, wet meadows, and other mesic habitats adjacent to sagebrush that may support sage-grouse habitat needs during different stages in their annual cycle.

As described in the Conclusion (Section III), details and application of monitoring at the fine and site scales will be described in the implementation-level monitoring plan for the land use plan. The need for fine- and site-scale-specific habitat monitoring will vary by area, depending on proposed projects, existing conditions, habitat variability, threats, and land health. Examples of fine- and site-scale monitoring include: habitat vegetation monitoring to assess current habitat conditions; monitoring and evaluation of the success of projects targeting sage-grouse habitat enhancement and/or restoration; and habitat disturbance monitoring to provide localized disturbance measures to inform proposed project review and potential mitigation for project impacts. Monitoring plans should incorporate the principles outlined in the BLM's AIM strategy (Toevs et al. 2011) and in "AIM-Monitoring: A Component of the Assessment, Inventory, and Monitoring Strategy" (Taylor et al. 2014). Approved monitoring methods are:

- "BLM Core Terrestrial Indicators and Methods" (MacKinnon et al. 2011);
- The BLM's Technical Reference "Interpreting Indicators of Rangeland Health" (Pellant et al. 2005); and,
- "Sage-Grouse Habitat Assessment Framework: Multiscale Assessment Tool" (Stiver et al. *in press*).

Other state-specific disturbance tracking models include: the BLM's Wyoming Density and Disturbance Calculation Tool (http://ddct.wygisc.org/) and the BLM's White River Data Management System in development with the USGS. Population monitoring data (in cooperation with state wildlife agencies) should be included during evaluation of the effectiveness of actions taken at the fine and site scales.

Fine- and site-scale sage-grouse habitat suitability indicators for seasonal habitats are identified in the HAF. The HAF has incorporated the Connelly et al. (2000) sage-grouse guidelines as well as many of the core indicators in the AIM strategy (Toevs et al. 2011). There may be a need to develop adjustments to height and cover or other site suitability values described in the HAF; any such adjustments should be ecologically defensible. To foster consistency, however, adjustments to site suitability values at the local scale should be avoided unless there is strong, scientific justification for making those adjustments. That justification should be provided. WAFWA MZ adjustments must be supported by regional plant productivity and habitat data for the floristic province. If adjustments are made to the site-scale indicators, they must be made using data from the appropriate seasonal habitat designation (breeding/nesting, brood-rearing, winter) collected from sage-grouse studies found in the relevant area and peer-reviewed by the appropriate wildlife management agency(ies) and researchers.

When conducting land heath assessments, the BLM should follow, at a minimum, "Interpreting Indicators of Rangeland Health" (Pellant et. al. 2005) and the "BLM Core Terrestrial Indicators and Methods" (MacKinnon et al. 2011). For assessments being conducted in sage-grouse designated management areas, the BLM should collect additional data to inform the HAF indicators that have not been collected using the above methods. Implementation of the principles outlined in the AIM strategy will allow the data to be used to generate unbiased estimates of condition across the area of interest; facilitate consistent data collection and rollup analysis among management units; help provide consistent data to inform the classification and interpretation of imagery; and provide condition and trend of the indicators describing sagebrush characteristics important to sage-grouse habitat (see Section I.D., Effectiveness Monitoring).

III. CONCLUSION

This Greater Sage-Grouse Monitoring Framework was developed for all of the Final Environmental Impact Statements involved in the sage-grouse planning effort. As such, it describes the monitoring activities at the broad and mid scales and provides a guide for the BLM and the USFS to collaborate with partners/other agencies to develop the land use plan- specific monitoring plan.

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Attachment A. An Overview of Monitoring Commitments

	Broad and Mid Scales					Fine and Site Scales
	Implementation	**Sagebrush Availability**	**Habitat Degradation**	**Population**	**Effectiveness**	
How will the data be used?	Track and document implementation of land use plan decisions and inform adaptive management	Track changes in land cover (sagebrush) and inform adaptive management	Track changes in disturbance (threats) to sage-grouse habitat and inform adaptive management	Track trends in sage-grouse populations (and/or leks; as determined by state wildlife agencies) and inform adaptive management	Characterize the relationship among disturbance, implementation actions, and sagebrush metrics and inform adaptive management	Measure seasonal habitat, connectivity at the fine scale, and habitat conditions at the site scale, calculate disturbance, and inform adaptive management
Who is collecting the data?	BLM FO and USFS Forest	NOC and NIFC	National datasets (NOC), BLM FOs, and USFS Forests as applicable	State wildlife agencies through WAFWA	Comes from other broad- and mid-scale monitoring types, analyzed by the NOC	BLM FO and SO, USFS Forests and RO (with partners)
How often are the data collected, reported, and made available to USFWS?	Collected and reported annually; summary report every 5 years	Updated and changes reported annually; summary report every 5 years	Collected and changes reported annually; summary report every 5 years	State data reported annually per WAFWA MOU; summary report every 5 years	Collected and reported every 5 years (coincident with LUP evaluations)	Collection and trend analysis ongoing, reported every 5 years or as needed to inform adaptive management
What is the spatial scale?	Summarized by LUP with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by MZ and LUP with flexibility for reporting by other units (e.g., PAC)	Variable (e.g., projects and seasonal habitats)
What are the potential personnel and budget impacts?	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	At a minimum, current skills and capacity must be maintained; data management costs are TBD	At a minimum, current skills and capacity must be maintained; data management and data layer purchase cost are TBD	No additional personnel or budget impacts for the BLM or the USFS	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment

Who has primary and secondary responsi-bilities for reporting?	1) BLM FO & SO; USFS Forest & RO 2) BLM & USFS Planning	1) NOC 2) WO	1) NOC 2) BLM SO, USFS RO, & appropriate programs	1) WAFWA & state wildlife agencies 2) BLM SO, USFS RO, NOC	1) Broad and mid scale at the NOC, LUP at BLM SO, USFS RO	1) BLM FO & USFS Forests 2) BLM SO & USFS RO
What new processes/ tools are needed?	National implementation datasets and analysis tools	Updates to national land cover data	Data standards and rollup methods for these data	Standards in population monitoring (WAFWA)	Reporting methodologies	Data standards data storage; and reporting

FO (field office); NIFC (National Interagency Fire Center); NOC (National Operations Center); RO (regional office); SO (state office); TBD (to be determined); WO (Washington Office)

Attachment B. User and Producer Accuracies for Aggregated Ecological Systems within LANDFIRE Map Zones

LANDFIRE Map Zone Name	User Accuracy	Producer Accuracy	% of Map Zone within Historical Schroeder
Wyoming Basin	76.9%	90.9%	98.5%
Snake River Plain	68.8%	85.2%	98.4%
Missouri River Plateau	57.7%	100.0%	91.3%
Grand Coulee Basin of the Columbia Plateau	80.0%	80.0%	89.3%
Wyoming Highlands	75.3%	85.9%	88.1%
Western Great Basin	69.3%	75.4%	72.9%
Blue Mountain Region of the Columbia Plateau	85.7%	88.7%	72.7%
Eastern Great Basin	62.7%	80.0%	62.8%
Northwestern Great Plains	76.5%	92.9%	46.3%
Northern Rocky Mountains	72.5%	89.2%	42.5%
Utah High Plateaus	81.8%	78.3%	41.5%
Colorado Plateau	65.3%	76.2%	28.8%
Middle Rocky Mountains	78.6%	73.3%	26.4%
Cascade Mountain Range	57.1%	88.9%	17.3%
Sierra Nevada Mountain Range	0.0%	0.0%	12.3%
Northwestern Rocky Mountains	66.7%	60.0%	7.3%
Southern Rocky Mountains	58.6%	56.7%	7.0%
Northern Cascades	75.0%	75.0%	2.6%
Mogollon Rim	66.7%	100.0%	1.7%
Death Valley Basin	0.0%	0.0%	1.2%

There are two anomalous map zones with 0% user and producer accuracies, attributable to no available reference data for the ecological systems of interest.

User accuracy is a map-based accuracy that is computed by looking at the reference data for a class and determining the percentage of correct predictions for these samples. For example, if I select any sagebrush pixel on the classified map, what is the probability that I'll be standing in a sagebrush stand when I visit that pixel location in the field? ***Commission Error*** equates to including a pixel in a class when it should have been excluded (i.e., commission error = 1 – user's accuracy).

Producer accuracy is a reference-based accuracy that is computed by looking at the predictions produced for a class and determining the percentage of correct predictions. In other words, if I know that a particular area is sagebrush (I've been out on the ground to check), what is the probability that the digital map will correctly identify that pixel as sagebrush? ***Omission Error*** equates to excluding a pixel that should have been included in the class (i.e., omission error = 1 – producer's accuracy).

Attachment C. Sagebrush Species and Subspecies Included in the Selection Criteria for Building the EVT and BpS Layers

- *Artemisia arbuscula* subspecies *longicaulis*
- *Artemisia arbuscula* subspecies *longiloba*
- *Artemisia bigelovii*
- *Artemisia nova*
- *Artemisia papposa*
- *Artemisia pygmaea*
- *Artemisia rigida*
- *Artemisia spinescens*
- *Artemisia tripartita* subspecies *rupicola*
- *Artemisia tripartita* subspecies *tripartita*
- *Tanacetum nuttallii*
- *Artemisia cana* subspecies *bolanderi*
- *Artemisia cana* subspecies *cana*
- *Artemisia cana* subspecies *viscidula*
- *Artemisia tridentata* subspecies *wyomingensis*
- *Artemisia tridentata* subspecies *tridentata*
- *Artemisia tridentata* subspecies *vaseyana*
- *Artemisia tridentata* subspecies *spiciformis*
- *Artemisia tridentata* subspecies *xericensis*
- *Artemisia tridentata* variety *pauciflora*
- *Artemisia frigida*
- *Artemisia pedatifida*

Appendix I

Disturbance Cap Calculation Method

APPENDIX I
DISTURBANCE CAP CALCULATION METHOD

In the USFWS's 2010 listing decision for sage-grouse (75 FR 13910 2010), the USFWS identified 18 threats contributing to the destruction, modification, or curtailment of the sage-grouse's habitat or range. The 18 threats have been aggregated into three measures (**Table I-1**):

- Sagebrush Availability (percent of sagebrush per unit area)
- Habitat Degradation (percent of human activity per unit area)
- Density of Energy and Mining (facilities and locations per unit area)

Habitat Degradation and Density of Energy and Mining will be evaluated under the Disturbance Cap and Density Cap, respectively, and are further described in this appendix. The three measures, in conjunction with other information, will be considered during the NEPA process for projects authorized or undertaken by the BLM.

DISTURBANCE CAP

This land use plan has incorporated a 3% disturbance cap within Greater Sage-Grouse (GRSG) Priority Habitat Management Areas (PHMAs) and the subsequent land use planning actions if the cap is met:

> *If the 3% anthropogenic disturbance cap is exceeded, not to exceed 1% per decade, on lands (regardless of land ownership) within GRSG Priority Habitat Management Areas (PHMA) in any given* ***Oregon PAC****, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMAs in any given Oregon PAC until the disturbance has been reduced to less than the cap.*

*If the 3% disturbance cap, not to exceed 1% per decade, is exceeded on all lands (regardless of land ownership) within a **proposed project analysis area** in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.).*

Table I-1
Relationship Between the 18 Threats and the Three Habitat Disturbance Measures for Monitoring and Disturbance Calculations

USFWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Energy and Mining Density
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

The disturbance cap applies to the PHMA within both Oregon Priority Areas for Conservation (Oregon PACs) and at the project authorization scale. For the Oregon PACs, west-wide habitat degradation (disturbance) data layers (**Table I-2**) will be used at a minimum to calculate the amount of disturbance and to determine if the disturbance cap has been exceeded as the land use plans (LUP) are being implemented. Locally collected disturbance data will be used to determine if the disturbance cap has been exceeded for project authorizations, and may also be used to calculate the amount of disturbance in the Oregon PACs. Although locatable mine sites are included in the degradation calculation,

Table I-2
Anthropogenic Disturbance Types for Disturbance Calculations
Data Sources are Described for the West-Wide Habitat Degradation Estimates
(Table copied from the GRSG Monitoring Framework)

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)[1]	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300

[1]Minor roads include transportation routes with maintenance intensity level 3, 4, or 5 on BLM lands or its equivalent on non-BLM lands.

mining activities under the 1872 mining law may not be subject to the 3% disturbance cap. Details about locatable mining activities will be fully disclosed and analyzed in the NEPA process to assess impacts to sage-grouse and their habitat as well as to BLM goals and objectives, and other BLM programs and activities.

Oregon PACs are based on current boundaries of ODFW Core Areas established in Hagen (2011). ODFW plans to update its Core Area maps as new information is obtained on winter habitat use, lek distribution, disturbance thresholds from various types of development, and success of mitigation measures (Hagen et al. 2011). These changes could affect Oregon PACs and measurements of anthropogenic disturbance. However, BLM does not anticipate ODFW will make substantial changes to Core Area boundaries.

Formulas for calculations of the amount of disturbance in the PHMA in an Oregon PAC and/or in a proposed project area are as follows:

- For the Oregon PACs:

  % Degradation Disturbance = (combined acres of the 12 degradation threats[1]) ÷ (acres of all lands within the PHMAs in an Oregon PAC) x 100.

- For the Project Analysis Area:

  % Degradation Disturbance = (combined acres of the 12 degradation threats[2] plus the 7 site scale threats[3]) ÷ (acres of all lands within the PHMA in the project analysis area) x 100.

The denominator in the disturbance calculation formula consists of all acres of lands classified as PHMA within the analysis area (Oregon PAC or project area). Areas that are not sage-grouse seasonal habitats, or are not currently supporting sagebrush cover (e.g., due to wildfire), are not excluded from the acres of PHMA in the denominator of the formula. Information regarding sage-grouse seasonal habitats, sagebrush availability, and areas with the potential to support sage-grouse populations will be considered along with other local conditions that may affect sage-grouse during the analysis of the proposed project area.

Agency Coordination

The BLM will cooperate with State of Oregon agencies to calculate baseline disturbance, develop a disturbance data base, and co-manage the disturbance cap to ensure BLM does not authorize new disturbance above the cap. The BLM

[1] See **Table I-1**
[2] See **Table I-1**
[3] See **Table I-3**

will monitor disturbance and the adaptive management triggers identified in the Greater Sage-Grouse Adaptive Management Strategy (Appendix D).

Decadal Disturbance Cap

Research indicates leks are absent from historic range with relatively low levels of anthropogenic development and infrastructure (Aldridge et al. 2008; Wisdom et al. 2011; Knick et al. 2013). Because the level of disturbance at which leks are abandoned varies across the species range and cannot be accurately predicted, the rate of new disturbance permitted in Oregon PACs will be metered to allow for further research, support adaptive management, and provide incentives for restoration and recovery from non-anthropogenic impacts such as fire and invasive species. In the first 10 years of this metering approach, a maximum 1 percent new discretionary disturbance may be allowed in Oregon PACs with existing disturbance below 3 percent. After the initial 10-year period, and at 10-year intervals thereafter, additional 1 percent discretionary disturbance may be permitted in Oregon PACs. New discretionary disturbance on BLM administered lands will not be allowed to result in 3 percent or greater total disturbance within an Oregon PAC or project authorization area at any time.

EXAMPLE CALCULATION OF DECADAL DISTURBANCE

In this example, the Oregon PAC contains 400,000 acres. Using the procedures described above, BLM calculates existing disturbance in the Oregon PAC, regardless of land ownership, totals 2,000 acres, or 0.5 percent. To remain below the 3 percent disturbance cap, no more than 9,960 acres (2.49% of 400,000) of new surface disturbance may be allowed over the 30-year period. In the first ten year period (starting with the first new approved disturbance), up to 4,000 acres (1% of 400,000 acres) of new disturbance may be allowed in this Oregon PAC.

A development is proposed in the Oregon PAC that would result in 1,000 acres of new disturbance. Since total disturbance in the PAC would remain below 3 percent, the BLM may consider this proposal. However, the proposed project also must not exceed the 3 percent disturbance cap at the project-analysis level scale. If BLM approves the proposal, it may consider additional proposals for new disturbance in this PAC up to but not exceeding 3,000 acres in the first 10 years. In this example, maximum total surface disturbance at the end of the first decade would be 6,000 acres or 1.5 percent. At no time will the 3 percent total disturbance cap be exceeded within the Oregon PAC and within the project-analysis area.

In the next 10-year period (beginning 10 years after the first approved new disturbance in the Oregon PAC), an additional 4,000 acres of new disturbance (1% of 400,000 acres) may be authorized. Maximum total surface disturbance by the end of the second decade would be 10,000 acres or 2.5 percent. In the final decade, no more than 1,960 acres or 0.49 percent new disturbance may be

authorized to prevent total disturbance in this Oregon PAC from reaching 3.0 percent.

At no point can BLM authorize discretionary disturbance that would result in more than 1 percent new disturbance in an Oregon PAC within a 10-year period, or authorize disturbance to exceed 3 percent in an Oregon PAC and project-analysis area, regardless of land ownership. If less than 1 percent new disturbance occurs in a 10-year period, disturbance will not exceed 1 percent in the following 10-year period (there is no "carry over"). Existing disturbance may be removed or reduced to provide "decision space" for authorizing new disturbance. For example, a utility provider could remove or relocate an existing power line to avoid Oregon PACs or co-locate the line with another existing line in the same Oregon PAC. Another example would be removing a communication tower, mine development, or redundant roadway. Treatments that restore natural vegetation to achieve GRSG habitat objectives also may reduce total surface disturbance.

DENSITY CAP

This land use plan has also incorporated a cap on the density of energy and mining facilities at an average of one facility per 640 acres in the PHMA in a project authorization area. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located into existing disturbed areas (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.). Facilities included in the density calculation (**Table I-1**) are:

- Energy (oil and gas wells and development facilities)
- Energy (coal mines)
- Energy (wind towers)
- Energy (solar fields)
- Energy (geothermal)
- Mining (active locatable, leasable, and saleable developments)

PROJECT ANALYSIS AREA METHOD FOR PERMITTING SURFACE DISTURBANCE ACTIVITIES

- Determine potentially affected occupied leks by placing a four mile boundary around the proposed area of physical disturbance related to the project. All occupied and pending leks located within the four mile project boundary and within PHMA will be considered affected by the project.
- Next, place a four mile boundary around each of the affected leks.

- The PHMA within the four mile lek boundary and the four mile project boundary creates the project analysis area for each individual project. If there are no occupied or pending leks within the four-mile project boundary, the project analysis area will be that portion of the four-mile project boundary within the PHMA.
- Digitize all existing anthropogenic disturbances identified in **Table I-2** and the 7 additional features that are considered threats to sage-grouse (**Table I-3**). Using 1 meter resolution NAIP imagery is recommended. Use existing local data if available.
- Calculate percent existing disturbance using the formula above. If existing disturbance is less than 3% and the rate of increase per decade since implementing the cap is less than 1%, proceed to next step. If existing disturbance is greater than 3% and/or exceeds 1% increase per decade, defer the project.
- Add proposed project disturbance footprint area and recalculate the percent disturbance. If disturbance is less than 3% and less than 1% increase per decade, proceed to next step. If disturbance is greater than 3% and/or exceeds 1% increase per decade, defer project.
- Calculate the disturbance density of energy and mining facilities (listed above). If the disturbance density is less than 1 facility per 640 acres, averaged across project analysis area, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than 1 facility per 640 acres, averaged across the project analysis area, either defer the proposed project or co-locate it into existing disturbed area.
- If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, fully disclose the local and regional impacts of the proposed action in the associated NEPA.

Table I-3
The Seven Site Scale Features Considered Threats to Sage-Grouse Included in the Disturbance Calculation for Project Authorizations

1. Coalbed Methane Ponds
2. Meteorological Towers
3. Nuclear Energy Facilities
4. Airport Facilities and Infrastructure
5. Military Range Facilities & Infrastructure
6. Hydroelectric Plants
7. Recreation Areas Facilities and Infrastructure

Definitions:

1. **Coalbed Methane and other Energy-related Retention Ponds –** The footprint boundary will follow the fenceline and includes the area within the fenceline surrounding the impoundment. If the pond is not fenced, the impoundment itself is the footprint. Other infrastructure associated with the containment ponds (roads, well pads, etc.) will be captured in other disturbance categories.
2. **Meteorological Towers –** This feature includes long-term weather monitoring and temporary meteorological towers associated with short-term wind testing. The footprint boundary includes the area underneath the guy wires.
3. **Nuclear Energy Facilities** – The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.
4. **Airport Facilities and Infrastructure (public and private)** – The footprint boundary will follow the boundary of the airport or heliport and includes mowed areas, parking lots, hangers, taxiways, driveways, terminals, maintenance facilities, beacons and related features. Indicators of the boundary, such as distinct land cover changes, fences and perimeter roads, will be used to encompass the entire airport or heliport.
5. **Military Range Facilities & Infrastructure** – The footprint boundary will follow the outer edge of the disturbed areas around buildings and includes undisturbed areas within the facility's perimeter.
6. **Hydroelectric Plants** – The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.
7. **Recreation Areas & Facilities –** This feature includes all sites/facilities larger than 0.25 acres in size. The footprint boundary will include any undisturbed areas within the site/facility.